Vol. VII JANUARY, 1921 No. 1

The International Journal of Orthodontia and Oral Surgery

A Monthly Journal Devoted to the Advancement of the Sciences of Orthodontia, Oral Surgery, and Dental and Oral Radiography

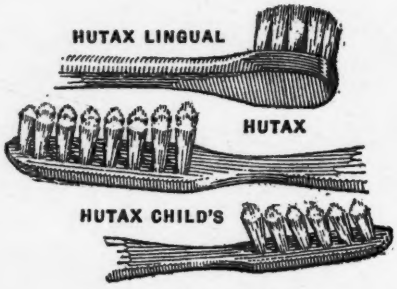
Martin Dewey, D.D.S., M.D., New York
Editor-in-Chief

PROPERTY OF
DENTAL LIBRARY
UNIVERSITY OF MICHIGAN
DON'T MUTILATE OR
REMOVE

PUBLISHED BY
THE C. V. MOSBY COMPANY
SAINT LOUIS

$6.00 Per Annum Single Copies, 75 Cents

LISTERINE
TOOTH PASTE



Cuts Two-thirds Actual Size

¶ Composed of an unusually efficient neutral cleansing and polishing substance, flavored with the essential oils which impart to the antiseptic solution Listerine its agreeable odor and taste —slightly acidulated with a pleasant fruit acid which deters formation of "tartar" about the teeth and provides mild salivary stimulation.

Hutax Tooth Brushes

"Hutax" means Mouth Health

¶ We have been appointed United States distributors for these brushes, which were designed by a Committee of Dentists of the International Oral Prophylactic Association. All profit accruing to the Association from their sale is expended for research or education.

¶ The Hutax brush, used in conjunction with the Hutax Lingual brush—which is particularly suited to cleansing the inner surfaces of the incisors, regulating appliances and bridge work—provide the most approved means of tooth brushing. Particulars gladly furnished on request.

LAMBERT PHARMACAL COMPANY

SAINT LOUIS, U. S. A.

The International Journal OF ORTHODONTIA AND ORAL SURGERY

MARTIN DEWEY, D.D.S., M.D.
Editor-in-Chief

VOLUME VII
JANUARY-DECEMBER, 1921

ST. LOUIS
C. V. MOSBY COMPANY
1921

International Journal of Orthodontia and Oral Surgery

A Monthly Journal Devoted to the Science of Orthodontia, Including Surgical Orthodontia, Oral Surgery, and Dental and Oral Radiography.

(See page 54 for further information.)

CONTENTS FOR JANUARY

The International Journal of
Orthodontia and Oral Surgery

VOL. VII ST. LOUIS, JANUARY, 1921 NO. 1

ORIGINAL ARTICLES

AN EASILY ADJUSTABLE LINGUAL LOCK FOR USE WITH REMOVABLE LINGUAL ARCHES

BY LOWRIE J. PORTER, D.D.S., NEW YORK CITY
Instructor in Orthodontia, College of Dental and Oral Surgery; Clinical Instructor in the Dewey School of Orthodontia

SINCE the publication of the August issue of this JOURNAL in which an article under the above heading was published, I have had so many inquiries by letter in regard to the making of this lock, that it has seemed advisable to give a little further description of the device together with illustrations.

This lock is made of two parts:

1. Lug soldered to a backing.
2. Rectangular tube to fit lug.

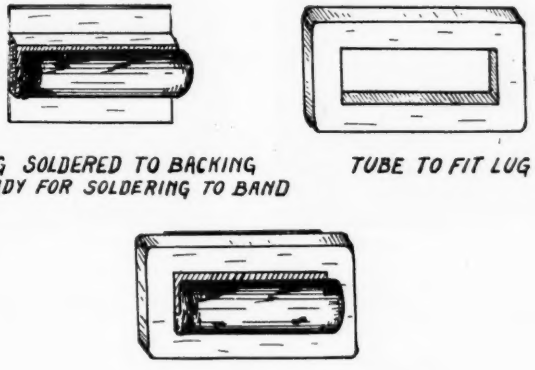


Fig. 1.

A 24- or 25-gauge spring wire is used to lock the tube on the lug. For ordinary movements I use 25-gauge spring wire as it is easier to remove, but, if the movement is a lingual movement or a rotation of the molars, I use

24-gauge as it fits the groove very accurately and makes the appliance very stable bucco-lingually. With the 25-gauge wire it is stable occluso-gingivally, which is the ordinary stability desired.

Fig. 1 shows the lug and tube as now made by the Blue Island Specialty Co., of Blue Island, Ill. The back is attached to the lug to facilitate soldering, thus eliminating, to a large extent, the danger of solder flowing onto the lug and preventing the tube from sliding into place.

Fig. 2.

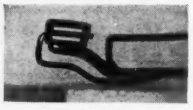


Fig. 3.

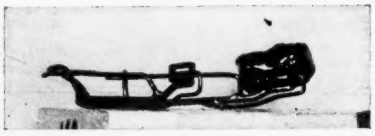


Fig. 4.

The lug should first be soldered to the band with 18 karat solder in the position desired on the molars. It is best here to flow a little solder on the band first and after heating this up hold the lug in position with a pair of tweezers to solder. Thus the lug is heated but little and the solder is not liable to flow over the lug, neither will the backing be burned.

The groove on the lug is to fit the 24- or 25-gauge [illegible] for locking the tube to the lug.

It is well now to polish the lug on the band before attempting to make the rest of the appliance, as it greatly increases the ease of placing and removing the tubes from the lugs in the construction and adjustment of the appliance.

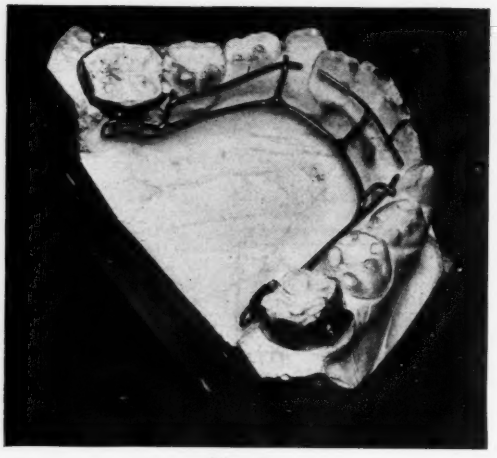


Fig. 5.

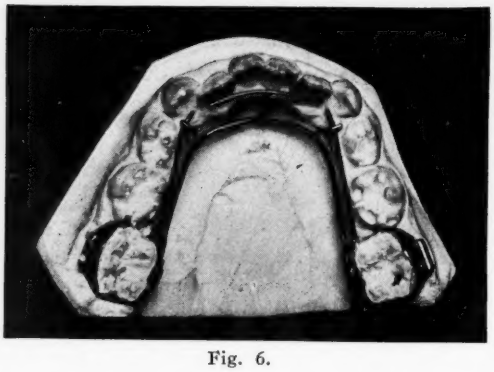


Fig. 6.

The lingual arch or base wire is next shaped as desired and the tubes soldered to it. Then place the tubes over the lugs with the arch in place and heat to a cherry red to make the arch perfectly passive and leave no strain on the molars. Complete technic for this was given in the August issue. This arch may also be made in three pieces if desired and then soldered together, rather than shaping one base wire.

Fig. 2 shows the lug soldered to the band and also plainly shows the groove in which the locking wire fits to hold the tube tight to the lug.

Fig. 3 illustrates the tube soldered to the arch ready for placement over the lugs on the bands, and Fig. 4 shows the arch, tube and lug assembled.

The locking wire will here be noticed in place in the groove in the lug. I now make this spring longer than was shown in the previous description, as I find it works much better in placing and removing from the mouth. This spring wire is soldered gingivally to the arch and about half an inch forward to the lug. It is then carried back, up and over the lug to fall into the groove. This gives a long elastic spring which is very easily manipulated.

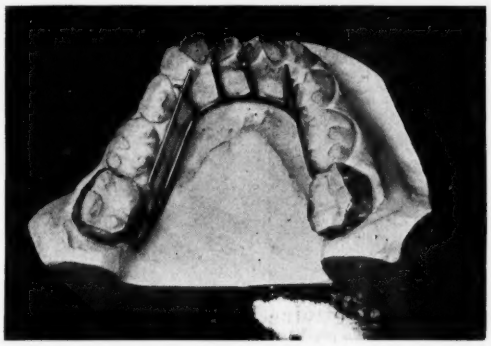


Fig. 7.

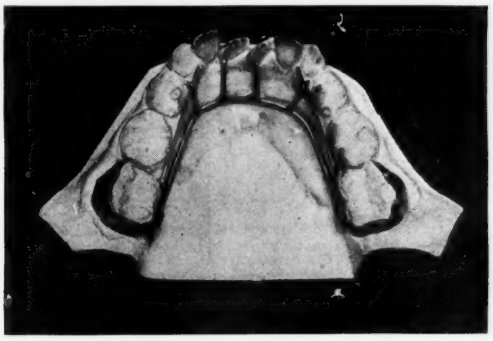


Fig. 8.

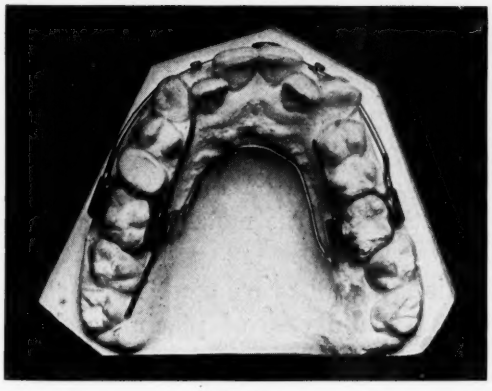


Fig. 9.

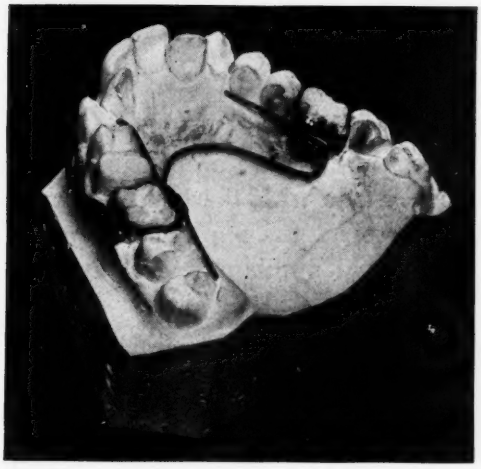


Fig. 10.

Fig. 5 shows a lower lingual appliance from a side view with the lock in position and Fig. 6 shows the occlusal view of the same. The base wire is of 18-gauge and serves as a molar stabilizer and also gives attachment for springs, etc.

The ease of adjustment, ease of placing and removing from the mouth together with the stability gained has amply given satisfaction and pleasure in the use of this lock.

Figs. 7 and 8 illustrate other appliances used with this lock in position.

Fig. 9 illustrates the use of this lock in a case of unilateral expansion. The molar and two premolars on the left side are to be moved buccally without

moving the teeth on the right side. Therefore a round tube has been used on the left molar band (Fig. 10) which allows tipping of this tooth but on the right side the lock described above is used (Fig. 11) which gives stationary anchorage and this, being also reinforced by the five adjacent teeth, practically insures sufficient resistance to move the three teeth on the opposite side of the arch. In using the round tube in conjunction with this lock the lingual appliance must be placed in the round tube first and that side carried fully to position and then the square tube will slip over the lug with no difficulty.

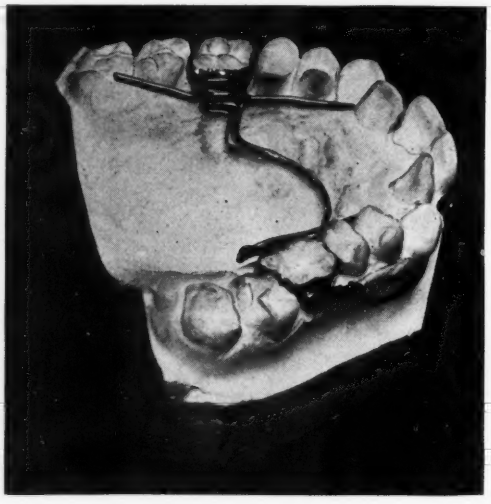


Fig. 11.

Emphasis must be placed on the fact that the bands should accurately fit the teeth and have a good impression taken with the bands on the teeth and a model made with the bands thus in place before the appliance is constructed. Then cement the appliance in place as a retainer with both bands attached to the lingual appliance. Be sure the bands are cemented on the teeth as they were when fitted. This is *very important*. Otherwise the molar teeth will be moved and will become sore at first.

If the correct technic is used I believe this lock will prove most satisfactory to any one using lingual appliances, as stability and ease of placing and removing are most certainly gained.

ORTHODONTIA AND ITS RELATION TO MODERN TENDENCIES OF DENTAL AND MEDICAL PRACTICE*

By Carlyle Pollock, D.D.S., St. Louis, Mo.

Instructor in Orthodontia, Dewey School of Orthodontia

TO QUOTE from a recent letter received from the chairman of your program committee in which he very kindly asked me to appear before your society, he said in part, "It is the intention of our medical society to tender a banquet to the dentists of the city, and it is my impression that the subject of orthodontia will fit in very nicely and no doubt be of mutual interest to both the medical and dental professions, it being a subject that will serve as a missing link, also a topic which has not been given very much consideration in the past, in medical discussions."

It seems, however, that if we were seaching about this evening for a subject that would serve as a "missing link" between the medical and dental professions we would be obliged to adhere rather closely to that paramount issue and the issue that is still being much contended, namely, "focal infection as related to the teeth and oral tissues."

Inasmuch as the subject of the "missing link" has been suggested, also for the reason that it is a very live and timely topic, and as a means of leading up to our subject, it is significant, at this time to all of us.

It is gratifying to note that some of the foremost medical men and dentists are calling a recess at least on the almost panicy extraction of teeth, and are adopting more the attitude of "stop, look and listen." The best of opinion seems to be still at greatly divergent points of focus upon the question of the extraction of teeth, for the purpose of removing infectious areas, that is, as to when they should and when they should not be extracted.

There seems to be no dispute, however, but that too much reliance has been placed upon the x-ray film and its interpretation as a final diagnosis. We are now beginning to realize that the x-ray is an aid or adjunct to diagnosis as are clinical manifestations; nevertheless, it must be conceded that the x-ray is one of the most important aids to diagnosis with which we are supplied.

The present day attitude of many of our physicians upon this subject seems to be about as follows: if there is the slightest possibility that infectious areas in and about the roots of the teeth of our patient may be responsible for some of his diagnostic symptoms and complaints, in other words if there is a remote possibility that the condition of his teeth and oral tissue might be a predisposing factor in bringing about the symptoms, let us extract the tooth or teeth, because after all a tooth is rather a minor consideration whether out of the mouth or in the mouth, when compared with the general physical condition of the patient. After the teeth have been extracted then we will be able to rest assured that all doubt has been removed, and we shall also be able to ascertain

*Read before the Decatur Medical Society, Decatur, Ill., Nov. 23, 1920.

the results which may follow. We might sum up the attitude of many physicians in a few words: "When in doubt, extract."

On the other hand, there is rapidly waxing a sentiment among the dental profession after having observed the extraction of not only many diseased teeth during the past few years, but also having witnessed the extraction of many perfectly normal teeth, as well as many only slightly affected, about as follows:

"Why condemn teeth to the forceps until it has been at least reasonably revealed that these structures are pathologically beyond possible repair?" To say the least, a most excellent and logical reason should be shown why the teeth should be removed before they are forever lost. The evidence of the x-ray alone is not sufficient to declare the root ends of teeth pathologically unfit for further service.

Inasmuch as many of my audience are medical men, and as this subject seems to be called to the bar of justice by many of the best minds in the medical and dental professions at this time, then with your indulgence I shall quote a few excerpts from an editorial which appeared in the *Journal of the National Dental Association*, March, 1920, and is excellent evidence of the trend of thought at least in the dental profession at this time:

"Medicine has helped us—quick to accept the findings of the leaders in bacteriologic and pathologic research, the great parent profession was quick to put the findings into effect with the result that daily patients were sent to the radiographer and thence to the dentist with orders for extraction. It was a good beginning, the beginning was started where it was the easiest and the patient was duly impressed with the intelligence of the physician. There was no palliative consideration of the teeth, for what is a mere tooth, and the dentist in his desire to be no whit behind the physician, extracted. In this combination the dentist was to blame. He is supposed to know something about teeth, while the physician knows nothing about them.

"Another collaborator in the slaughter was the elusive shadow with its enigmatic suggestion of ill aided and abetted edentulousness. For a long enough period the film and forceps might have been the dental coat of arms. And who would hang his honor to a film today. But the skiagram is the last word in science, and we are scientists so—*exeunt*. Often the radiographer returned a diagnosis with the film until dental pride grew tender, and then with ethical religiosity he suggested 'diagnosis upon request.' Frequently the radiographer was not a dentist.

"All the while there have been conservatives who urged that we were too free to extract. There are men in our profession whose words are always 'apples of gold' if we would only listen to them. Thumbing our literature, it is easy enough to find them, words of council, words of fear—fear of the far swing of the pendulum. In their long experiences they have seen great enthusiasms sweep over the profession before, only to leave a wake of shattered hopes, and a clientele rich in resentment. They foresaw this day too, and urged wisdom and discretion, only to be regarded too often as old fashioned and behind the times. Also these men do not run to print, as do so many whose flow of new thought effects a screen for hiding previous ignorance."

In April, 1920, the Missouri State Dental Association unanimously passed resolutions commending the attitude and position taken by the editor of the *Journal of the National Dental Association*, in the above editorial, and directed the secretary to forward to him, a copy of such resolutions. To those who are following the trend and culmination of opinion in the dental profession, it is quite obvious that the hand of caution is now being raised against the too prevalent mutilation of mouths and the mastication function in the mouths of our patients.

We are not unaware, neither do we lose track of the actuality, that some of the physical benefits derived in individual and outstanding cases by the removal of diseased teeth have been nothing short of phenomenal. These almost astounding results, however, we have heard a great deal about in the literature of both professions, and, not unlike the phenomenal pecuniary benefits enjoyed by the location of an oil gusher in Texas, which have benefited a few fortunate individuals have been in turn responsible for the loss of millions of dollars expended in dry holes by the many less fortunate ones, so have these remarkable cases been responsible for the mutilation of many mouths without beneficial physical improvement following.

It is to be hoped, however, that the extraction panic of the last few years will go down in medical and dental history as the beginning of a new epoch in the relation of the two professions, that it will also again prove the old epigram that "It is an ill wind that blows no good," and the ultimate results of these past measures will develop in the dental profession, not only the desire to advance scientific methods of practice to such an extent that we may be able to save teeth rather than remove their functions entirely, but to stimulate in us, the modern idea and development of preventive dentistry.

There are some branches of dentistry in which we have evolved a very keen appreciation of the whole masticating apparatus as a unit. A full complement of teeth and each tooth in its normal position in the dental arch is the ideal of this specialty, and it is a rather interesting study and science, when well understood.

It shall be my purpose then, by means of the accompanying illustrations, to show you nothing particularly new or that which has not been known for a number of years, but to picture to you the angle or perspective of the dental mechanism from the standpoint of an orthodontist, and it will also be my particular effort to point out that the dental architecture of man, means a great deal more to his physical development, well being, and general health than is generally known. If my remarks at times appear a trifle elementary to my dental friends, it is to be remembered that we assume the medical men are as unacquainted with some departments of our work as we dental men may be with the various specialties of medicine.

In the subject of orthodontia we fortunately are not required to deal, to a great extent, with the question of the extraction of teeth, for we are concerned more directly with the correction of an abnormal dental apparatus which we call malocclusion of the teeth.

In this department of dentistry we are, one might say, almost perverse on the question of retaining the natural teeth in the mouth, and in as good condi-

tion as is possible. While we are fully and alertly cognizant of the almost endless chain of difficulties which may arise in the general physical condition directy from a diseased tooth, we do not take the extraction of a tooth in the dental arch lightly, for reasons which I shall presently endeavor to point out in detail.

For your information, then, some of our authorities upon this subject have defined orthodontia in short, and to the point, as the science that has for its object the correction of malocclusion of the teeth. Malocclusion is a deviation from the normal to such an extent as to interfere with the functions of the

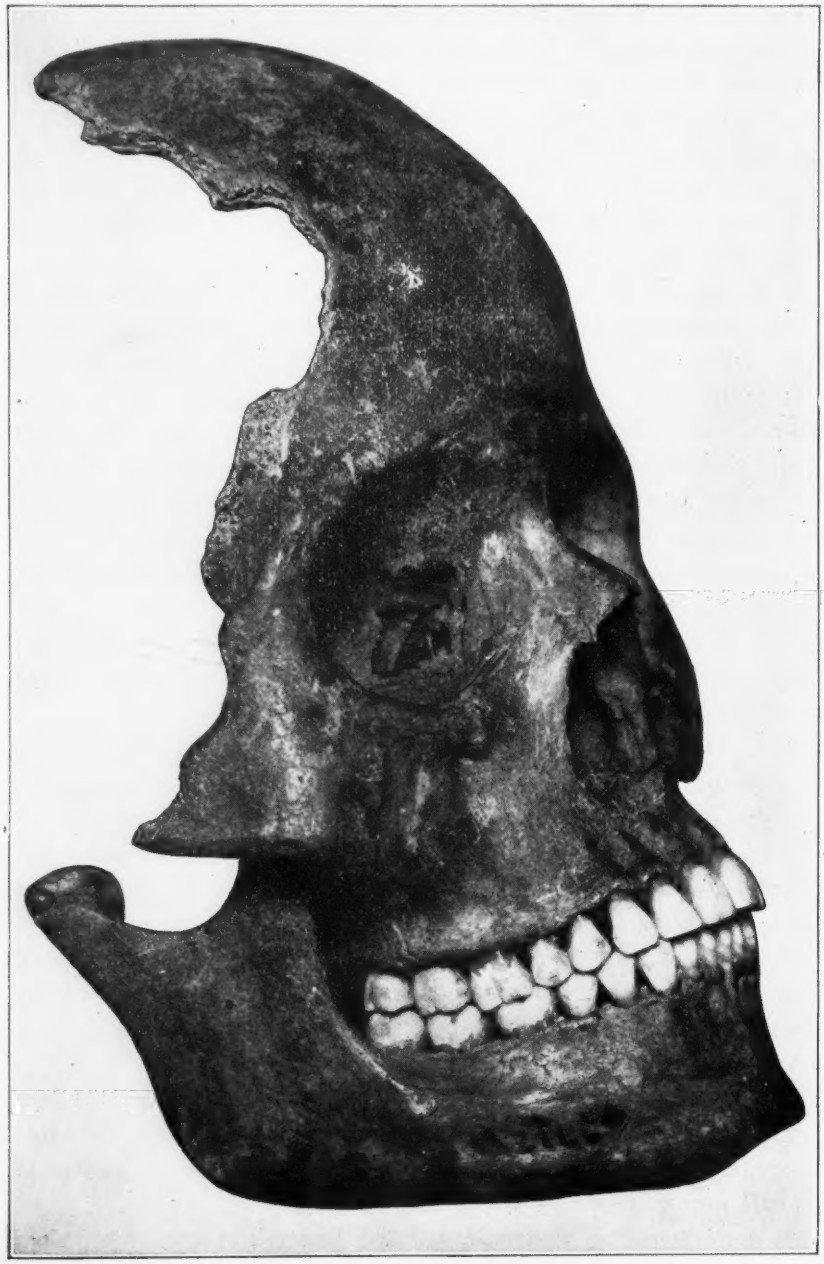


Fig. 1.—Normal occlusion (Aztec skull). (Ketcham.)

teeth. Normal occlusion is the normal relation of the inclined planes of the teeth, and so on. To show the normal anatomy of occlusion of the teeth and its relation to the lower third of the face, attention is called to Fig. 1 which represents the mechanisms of nature intended for a thorough masticating machine. Each tooth in the maxillary arch has an exact position which it occupies in relation to each tooth in the mandibular arch. In this illustration each tooth has its proper position to occupy, and if it were any other place, the dentition would be what we call a malocclusion. If you are able to call upon your imagination and picture the apparatus shown in actual operation, the lower jaw opening and closing on its hinge, namely, the temporomandibular articulation, and constantly and systematically hammering away upon the upper jaw in its rhythmic excursion in the mastication of food, exerting hundreds of pounds of pressure, you will then have a mental picture of one of the tremendous forces which act as a powerful influence in developing this lower portion of the face, and maxillary structures.

Not only do we find this force along with many others, a most effective governing influence upon the development and formation of the dental mechanism, but equally is it distributed over many other areas of the skull. Particularly are certain forces of occlusion involved in the ultimate formation of the maxillary sinuses, as well as the sphenoidal, frontal, and all other sinuses. The nasal fossa and its development both in size and form is unavoidably interlocked with the development of the oral cavity and dental arches.

Medical men present are perfectly familiar with the not uncommon deflected nasal septum which is so closely interlocked and often influenced by the size and architecture of the hard palate. These great forces which influence the development of the osseous formation of the lower third of the face and skull have no small bearing upon the nasal septum and turbinate bones, as has been conclusively demonstrated by Cryer, G. V. I. Brown, Angle, Ketcham, Dewey, Noyes, and many other writers and investigators.

There are other forces involved, of course, in this development, a combination of mechanical forces known as the forces of occlusion with which I shall attempt to make you familiar by means of the following illustrations, a most minute understanding of which is necessary to the orthodontist, as these various forces are really the skeleton of his whole work.

1. Forces of the inclined planes of the teeth.
2. Muscular, tongue and lips, cheeks, etc.
3. Atmospheric pressure.
4. Normal cell metabolism.
5. Normal proximal contact.
6. Harmony in the size of the arches.

An infinite amount of investigation has been done by Angle upon the mechanism or occlusion of the teeth. He has shown how the forces of occlusion are directly concerned in the normal development of the face. The normal locking of the cusps of the upper teeth with those of the lower dental arch, form and mold the arch shape of the jaws by their triturating and grinding movements one with the other.

Probably the best work we have upon this particular phase of orthodontia

is Cryer's *Internal Anatomy of the Face* in which he points out many anatomic variations and many of them directly linked with the formation of the dental apparatus. In his conclusions he says, "It is, of course, to be understood that the factor behind these anatomic variations leading to assymmetrical development is necessarily nutritional that the most important etiologic factor in the irregularity of the upper dentures of mouth breathers is the loss of the developing and molding influence which directly result from the percussive force of occlusion exerted by the mandible upon the maxillary arch." That the presence of adenoid growths in the nasopharynx or in fact any cause which interferes with the normal closing of the mouth, at once interferes with occlusion which he regards as the most patent factor in the normal development of the relation of the upper to the lower denture. Mouth breathers also lose very largely the effect of the pressure which is exerted laterally in normal mouths by the tongue.

The extraction of the permanent teeth of the child not only mutilates the dental apparatus within itself beyond repair, but in addition to this to a greater or less degree throws this developmental scheme of Nature out of plumb. The extraction of several teeth, may disturb the developmental forces to such an extent as to cause deviations of the nasal septum, and assymetrical development of the entire maxillary structures. The extraction of the first permanent molar tooth of a child is about the greatest crime which may be committed upon the dental equipment of a child.

It is a well-known fact, but not usually given much consideration, that the alveolar processes are a temporary structure which are literally grown and formed (using the maxillæ as a base of supplies) for the purpose of being a supporting structure for the teeth. It is highly cancellous, varies in every individual, and is constantly in a state of transition as the teeth develop, or are lost. It disappears entirely with the loss of all of the teeth, and its entire disappearance has an effect upon the antra, the septum, and upon the mandible. The antral floors rise to a level with the nasal floor, and it is contended there is a marked bowing in the vertical axis of the septum with the shortening of the hard palate which is always present after the loss of the teeth. It is also pointed out that each bone in the skull should bear a definite relationship to each other, as to size, then it follows, that any one or two of these bones which shall fail to attain their full size, must necessarily affect the size of all bones articulating with them. Deficient development, then, of the alveolar processes, no matter what the cause, affects that of the whole face, and especially that of the nasal spaces.

By the extraction of one, two, or many teeth, just in proportion is the structure and osseous formation wrecked in both its function and purpose in the individual. The masticating function, which is such a tremendous influence in the development of these parts, appears as the teeth appear, in life and vice versa, the masticating function disappears as the teeth are removed, unless they are replaced by some artificial substitute.

In a series of experiments conducted upon rabbits, Lawrence Baker has shown by destroying the masticating function entirely on one side of the mouth of rabbits, the bones and sinuses of this side of the face and skull develop only

slightly compared to the development and growth of the side in which the masticating function has been allowed to remain intact.

The lack of growth in the osseous structure of the rabbits on the affected side not only manifested itself in the maxillary region, but extended entirely up to and including the zygoma and parietal regions.

A number of years ago it was not at all uncommon to extract teeth for the purpose of correcting irregularities or so-called crooked teeth. This is now not even considered for the reasons which I have tried to point out to you. We know that when we extract teeth we not only lose a good tooth which was placed there for a very good purpose, but in addition to this, we then and there start a shifting of teeth, not unlike the shifting sands of the seashore which in time

Fig. 2.—Shape and relation of nasal cavity and roof of mouth at birth. Note absence of maxillary sinus.

completely wrecks the masticating apparatus from a standpoint of balance and efficiency.

Every dentist of wide experience and who has observed the results of tooth extraction over a period of years is cognizant of the fact that the most direct and unobstructed route to old age is the complete extraction of one's teeth, insofar as appearance may be concerned, at least.

In Fig. 2 we have the shape and relation of the nasal fossæ and roof of the mouth at birth. There are no maxillary sinuses at this period, and it is not at all difficult to imagine the tremendous influence which must be exerted upon these forming sinuses, cavities and bones by the mastication of food, as well as by all of the other forces of occlusion.

It seems to be quite generally accepted that mouth breathing as a result

of enlarged lymphoid tissue is the most outstanding single cause of irregularities of the teeth; then to correct these conditions, it is reasonable to suppose that all conditions which predispose to mouth breathing should be removed at the earliest possible moment in order to discourage this habit to the fullest extent. (Fig. 3.)

We are aware that there are many other causes of malocclusion, however, including, of course, all of the general nutritional disturbances in the growing child, childish habits, such as thumb-sucking, lip habits, biting of the tongue, etc., *ad infinitum.*

Malnutrition, from whatever cause, is obviously one of the outstanding etiologic factors of malocclusion. Malnutrition may be the result of any one of the many systemic disorders to which children are heir, which may, in turn, manifest itself in the development of the osseous and dental structures. On the question of heredity, we can only draw our own conclusions, and be sure of nothing; however, the question of heredity must be reckoned with in our work the same as is done in the treatment of all physical defects.

Fig. 3.—Showing abnormal muscular lip pressure associated with mouth-breathing. Illustrates also almost entire loss of musculature of the lip, as a result of disuse.

The medical man and the dentist of today should at least be sufficiently informed upon these innocent vices of childhood to be able to recognize some of the simpler etiologic factors in the development of these deformities and be able to advise parents intelligently when casual observation will reveal the development of abnormal conditions in their incipiency and many times as the result of some simple childish habit.

It has not only been my own observation, but that of many orthodontists, that the apparently innocent childish habit of thumb sucking causes many malocclusions that remain a permanent deformity throughout life of an individual. This habit may be broken in infancy with the proper precautions, however, and the habit should be discouraged whenever possible. We find that even at the present time not a few physicians are advising parents to allow their babies to suck their thumbs, maintaining as an argument that it is an instinctive impulse and will serve as a pacifier for the child. It is true that many infants persist in

this habit over a long period of time with no apparent permanent injury having developed, however, it is obvious we have just enough of them who do develop malformations as a result of this habit that the habit should be vigorously discouraged by medical men and dentists, collectively, and at all times when the opportunity presents.

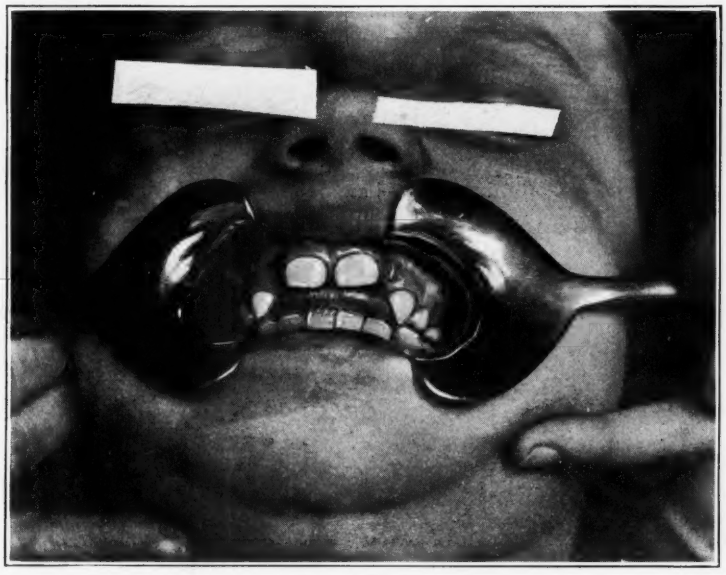


Fig. 4.—Typical malocclusion as a result of sucking the thumb, the upper front teeth erupting far in advance of the lower ones. The thumb being in the mouth constantly, prevents normal growth development in many instances.

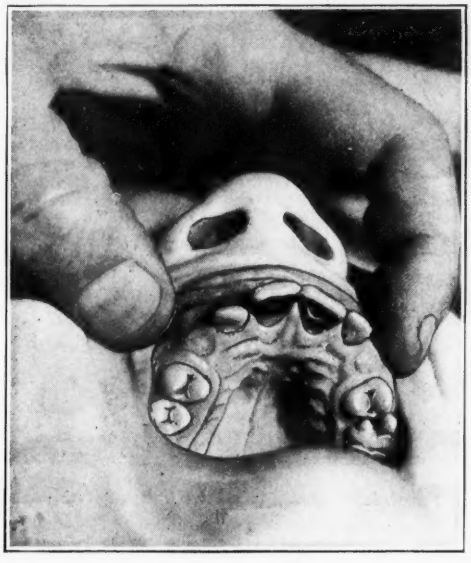


Fig. 5.—Narrow and constricted upper dental arch with inclining upper front teeth, being exaggerated as a result of a habit of constantly biting the lower lip.

Fig. 4 illustrates a typical malocclusion as a result of an unruly thumb habit extending over a period of years. Many young persons even at the ages as advanced as sixteen who persist in this habit as a result develop an orifice in the front of the dental arch when the teeth are in occlusion which exactly as-

sumes the shape of the thumb. Patients who persist in this habit up to advanced adolescence, many times indulge in it, then only at night time, when asleep and are unconscious of the habit during the daylight hours.

Another habit, that of biting the lip (Fig. 5) if indulged in persistently usually results in protruding front teeth, in conjunction with receding lower dental arch, as a result of the constant pressure of the elastic lip being exerted,

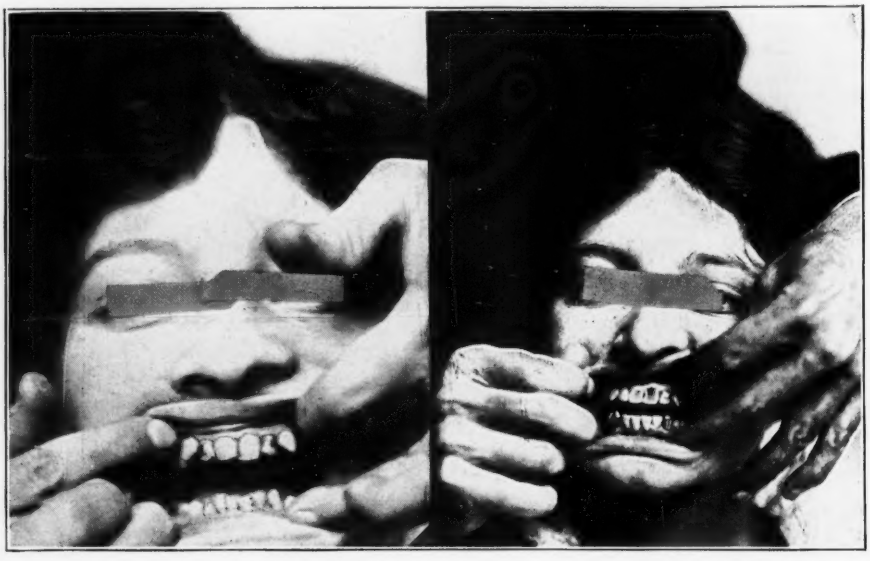


Fig. 6.—Crowded and irregular teeth. Insufficient bone area to accommodate all of the teeth in proper position.

Fig. 7.—Deficient development of mandible with all of lower teeth, and dental arch in distal occlusion to upper (*a*) in child of four years; (*b*) same case at five and one-half years.

as in influence during the formation period pressing against the upper front teeth and forcing them outward. After the damage is wrought it usually persists throughout a lifetime unless it is corrected, as the space between the upper and lower teeth has been constructed and designed so to speak, just exactly to conveniently accommodate the lip. Note in Fig. 5 the pointed and narrow upper arch and teeth which is typical of these cases.

Certain forms and types of nursing bottles for infants are known also to

be injurious to the mouths. Pacifiers are open for criticism; however, it is a question sometimes as to whether or not this criticism is always justified inasmuch as these pacifiers lack the weight of that of a bottle or the weight of an arm, to bear pressure on the chin and cartilaginous palate at this critical period of growth.

We find probably one of the most dangerous periods for the cultivation of these habits is the transitional period at which time a child is losing his deciduous teeth and erupting his permanent ones, inasmuch as no small amount of damage may be done at this time to the growing structures. At this stage of development the dental arches are in their transitional and formative period and any abnormal influence seems to be most effective in designing the formations of osseous structure which are to follow later.

Fig. 8.—Caused probably by allowing deciduous teeth to remain in position too long, the roots of the deciduous teeth not having absorbed normally. Insufficient growth of the alveolar processes to accommodate all of the teeth in proper position.

By a series of slides which are to follow, I will attempt to point out the close relationship which exists between a normal dental apparatus, and the remaining internal and external structures of the face and skull.

In Fig. 6 we have a condition which is not at all uncommon. Crowded and irregular teeth, which are always associated with underdeveloped maxillary osseous structure, the maxillaries being too small in size and bulk to conveniently accommodate all of the teeth in their proper position. The teeth then get into their positions as best they are able to, a sort of "catch as catch can" and "survival of the fittest" excursion.

This type of malocclusion is many times associated with respiratory difficulties, and the orthodontist feels it of prime importance to insist that the phar-

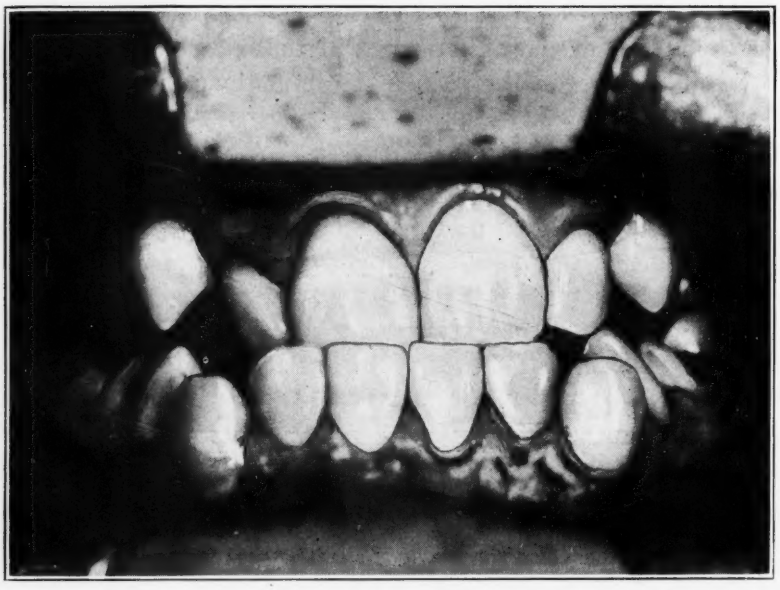


Fig. 9.—Narrow and constricted development of upper dental arch allowing teeth to become locked within the lower dental arch. This condition may be largely prevented in many cases by proper dental treatment.

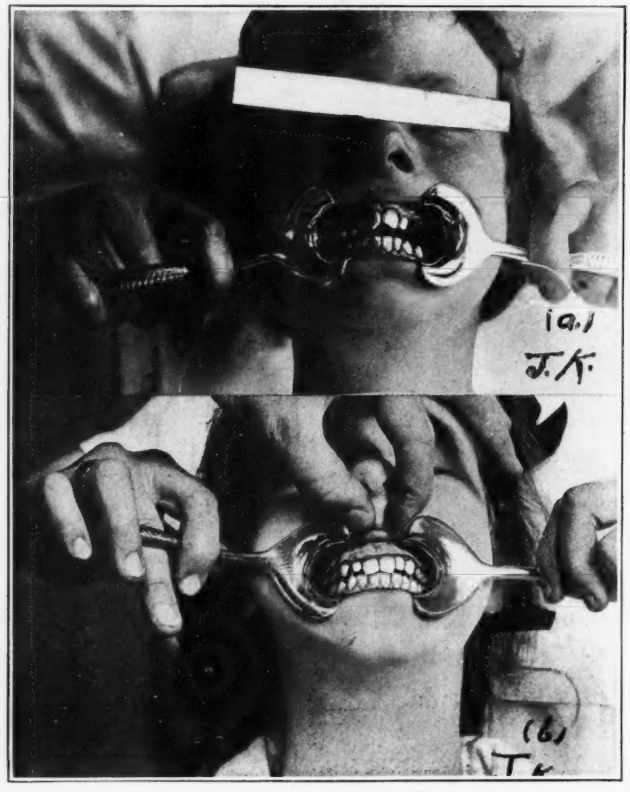


Fig. 10.—(*a*) Narrow constricted dental arches, history of adenoids and tonsils, typical mouth breather. (*b*) After upper and lower dental arches have been expanded.

ynx be entirely clear of enlarged lymphoid tissue, before being justified in going ahead with correction. In order to correct this condition, we do not attempt to simply straighten the teeth as is generally supposed, however, we do by means of the teeth cause the bones to enlarge and develop, which will then very easily allow all of the teeth to assume their correct positions, and occlusions, accordingly, when the bone has been developed sufficiently to accommodate all of the teeth.

Very young children many times develop a marked malocclusion very early in life. (Fig. 7, child age four, left) we are unable to know positively what caused a condition of this kind, however, we do find them quite frequently associated with mouth breathing, as well as thumb sucking. The possibilities

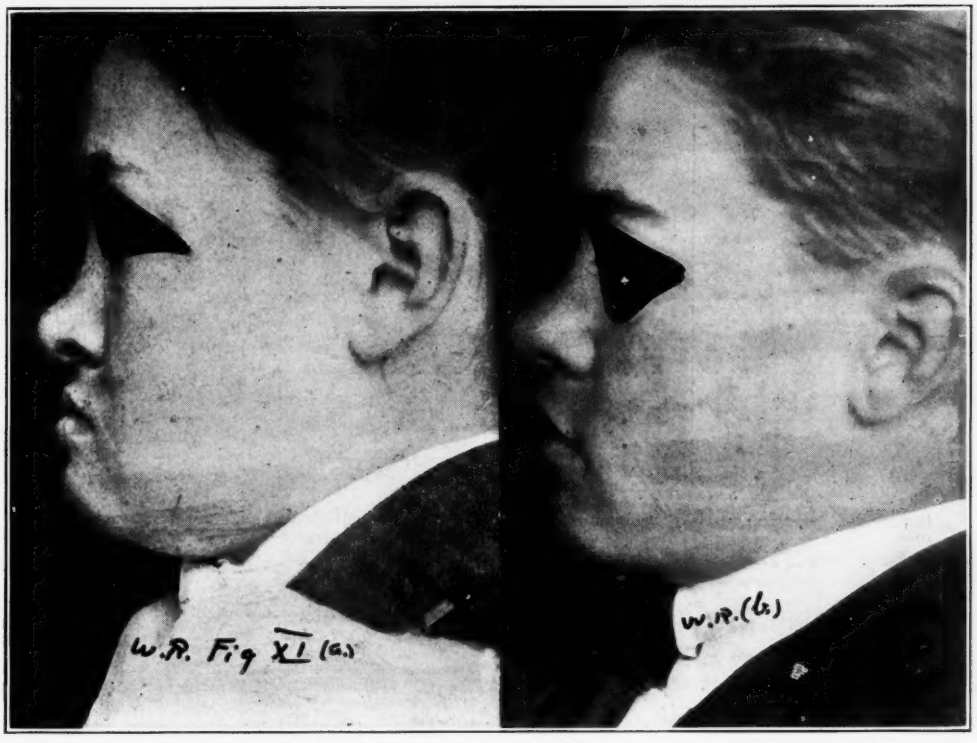


Fig. 11.—(*a*) Upper dental arch in lingual occlusion with the lower, locking the upper, preventing its proper growth and development. (*b*) After proper occlusion has been established, by shifting the relation of the dental arches.

for improvement are very great, by proper treatment, however, many thousands of these cases remain throughout life without treatment.

The retention of the baby or deciduous teeth for too long a period after their roots should have been absorbed by nature, causes many cases of malocclusion. The permanent tooth erupting in its crypt at times fails to absorb the root of the deciduous tooth which in turn then mechanically causes the permanent teeth to find their places in the dental arch in their improper positions, or in malocclusion.

In Fig. 8 we see a typical case of this type which, no doubt, has been influenced at least by the too long retention of the deciduous teeth in the mouth. Fig. 9, another type of typical malocclusion, the lower mandible teeth occluding in advance of the upper maxillary teeth. In order to correct a condition of this

kind it becomes necessary to shift the entire occlusion of the mandibular and maxillary arches, and anything short of this means failure in the end, crowded and irregular teeth in both arches, there not being sufficient bulk of the maxillary bones to accommodate all of the teeth.

Fig. 10. History of adenoids and enlarged tonsils. Very narrow and constricted maxillary arch with high vault, and deviated nasal septum. Distal occlusion of the lower teeth, typical mouth breather. This type of malocclusion is quite common and appears very early, being particularly noticeable about

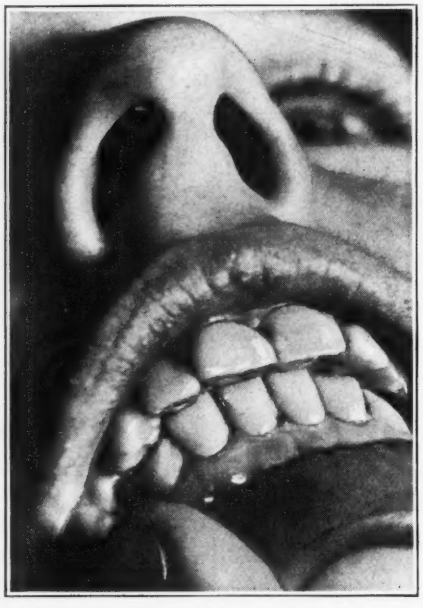


Fig. 12.—Malocclusion having been caused by the early childhood extraction of the permanent molar teeth. Case is also complicated by a persistent lip habit, crowding the upper teeth outward and the lower teeth backward. Lower teeth occlude on the soft tissues of the palate.

the period of the eruption of the central incisor teeth. Previous to this time, however, these cases are easily manifest to the experienced eye, and usually respond to treatment rapidly. The forces of occlusion having been perverted to a marked degree, the entire structure has developed in an abnormal direction.

BIBLIOGRAPHY

Anthony, L. Pierce: The Present Day Tendencies of Dental Practice.
Cryer: Internal Anatomy of Face.
Dewey, Martin: Practical Orthodontia.
Noyes, Frederick B.: The Development of the Teeth and Occlusion as Factors in the Development of the Facial Bones.

SOME RECENT ADVANCES IN ORAL PATHOLOGY*

By Arthur Hopewell-Smith, Sc.D., L.R.C.P., M.R.C.S., L.D.S.,
Professor of Dental Histology, Pathology, and Comparative Odontology, University of Pennsylvania, Philadelphia, Pa.

INTRODUCTORY

THE subject announced as the title of this paper is of such great importance and covers so wide an area that it is impossible to do anything like adequate justice to it in the time at the disposal of the writer. It will be well, therefore, to consider it from the dental viewpoint only, and to restrict even that to some matters which, having come immediately under the notice and investigation of the speaker, should be of interest to his present audience, who deal so largely with the dental requirements of children, the main idea being the stimulation of thought and the encouragement of further and more serious work in the investigation of dental and oral pathology. For it is a lamentable fact that toilers in this field are few and far between, and the surface of the ground is only beginning to be scratched and dug into. Attention may be directed, therefore, to a few remarks on dental caries, "pyorrhea alveolaris," and diseases of the dental pulp.

DENTAL CARIES

Of all branches of dental pathology the study of dental caries is supreme in everyday work. So universal are its manifestations, so widespread and devastating its effects, that it is a question of curious interest that investigations as to its origin and nature have but seldom during the last few years been undertaken. It is assumed that the doctrines of Miller,[1] Leon Williams,[2] Goadby,[3] Black,[4] Walkhoff,[5] Pickerill,[6] and other authorities hold good and, in some quarters, the opinion is expressed that there is no necessity for further prosecution of its etiology. This is a nonprogressive and unscientific attitude of mind, for bacteriology—a comparatively new science and of high importance in this connection— has done, and is doing, much in the way of advancement.

MOST RECENT THEORY REGARDING ITS CAUSATION

Among the latest writers on the causation of dental caries is Eckermann,[7] who, from the viewpoint of the physicist and chemist, rather than that of the clinician, now attempts to shatter the lactic acid theory of Miller. He contends, briefly, that this condition is not caused by lactic acid but by osmosis. Regarding the dentine as a semipermeable membrane, he maintains that it acts chiefly at the gingival margins of the teeth—where bone atrophy has occurred—as an osmotic membrane. Regarding also human enamel as defective in structure, he declares that osmosis takes place even in this tissue.

The process, as he conceives it, would appear to be as follows. In conse-

*Read before the Meeting of the American Society of Orthodontia, Chicago, Ill., April 5-7, 1920.

quence of the large amount of salt and sugar consumed by civilized peoples, the saliva becomes loaded with dissolved material of a greater specific gravity than the lymph in the dental pulp. Osmosis occurring at the weak spots in dentine and enamel already mentioned, it follows that the lymph is forced into the dentine and ultimately into the enamel, forming colored tracts which, on becoming infected by microörganisms, he calls "caries canals."

This astonishing, wholly irrational, fantastic and incorrect theory is the latest. Reference to it is only here given to demonstrate that a question like the causation of dental caries can be used at times as an opportunity for the display of colossal ignorance on the part of incompetent observers for the exploitation of certain ends. It can really only be settled satisfactorily by the concerted action of dental surgeon, histologist, biologist, chemist, physiologist and pathologist—and common sense. The concept has probably arisen from the erroneous interpretation placed upon the histologic appearances of dentine and enamel following the injection at high pressure of stains and dyes by means of a hypodermic syringe in the pulp canal, as advocated and practiced by von Beust. Thus recent advances become retrogressive and therefore harmful.

The results of the above are highly unsatisfactory and entirely misleading. The etiology of dental caries is not yet thoroughly known; its problems by no means solved. In this connection a resolution passed by the Third International Dental Congress in Paris may be recalled: "Our present knowledge of dental caries cannot explain the different forms of this malady." After study of the question, extending over many years, the speaker has come to the following conclusions:

The only certain things known about it are its signs, its complications, its external origin, its contemporaneousness with early life. That it is a molecular disintegration of the hard tissues, beginning in decalcification of inorganic constituents and ending in the dissolution of their organic parts, is generally believed; but its causes are unknown and even which teeth are most seldom or most frequently the object of its attack.

With regard to the relative dental susceptibility G. V. Black probably got nearer the truth than any other authority.

The accompanying charts show the percentages of dental caries occurring (Chart I) in twelve thousand extractions (Magitot); (Chart II) in thirty thousand extractions (Pare and Wallis); (Chart III) in private practice, records of occurrence during adolescence (G. V. Black); and (Chart IV) in dental hospital practice, all ages, (Lewis and Hopewell-Smith). The side numerals indicate the percentages. The letters with their numerals indicate maxillary teeth when the numeral is above the letter, mandibular teeth when below the letter. The new terminology is here adopted.

It is thus seen that Charts I and II give the maxillary first molar and mandibular first molar as the most frequently affected, Chart III the first maxillary incisor, and Chart IV the second mandibular molar and second maxillary molar. But the truth cannot be thoroughly determined except by the combined action of a committee of dental men who, carefully noting the onset of the condition, unanimous in their conception of the phenomena that constitute the initial stages, and willing to devote some time to charting

mouths, and generally adopting the principles as set forth on the covers of every copy of the "Dental Cosmos"—of Observing, Comparing, Reflecting and Recording.

DENTAL CARIES NOT A DISEASE

Dental caries is strictly not a disease; it is not caries. It does not resemble, in the very slightest, caries of bone, which is a form of ulceration following an

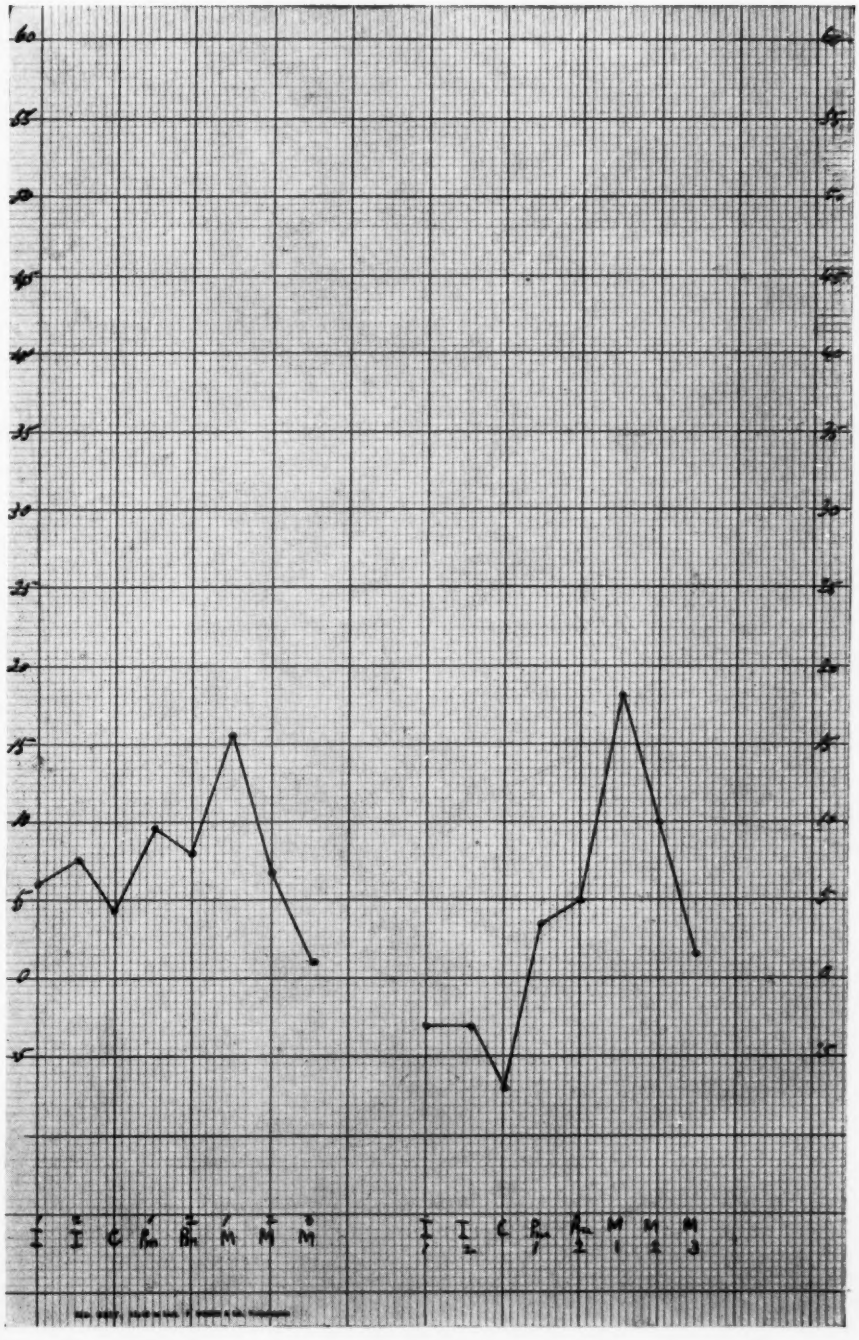


Chart I

osteitis due to subacute inflammation or tuberculosis or syphilis. A cavity in the hard palate which is often produced during the course of tertiary syphilis is a manifestation of the disease, is a necrosis of the bone—not a disease itself. Caries of enamel and dentine is not a disease, but a sign or manifestation of an external pathologic condition affecting the environment of these tissues. It cannot be communicated from person to person. It is neither strictly infectious nor contagious.

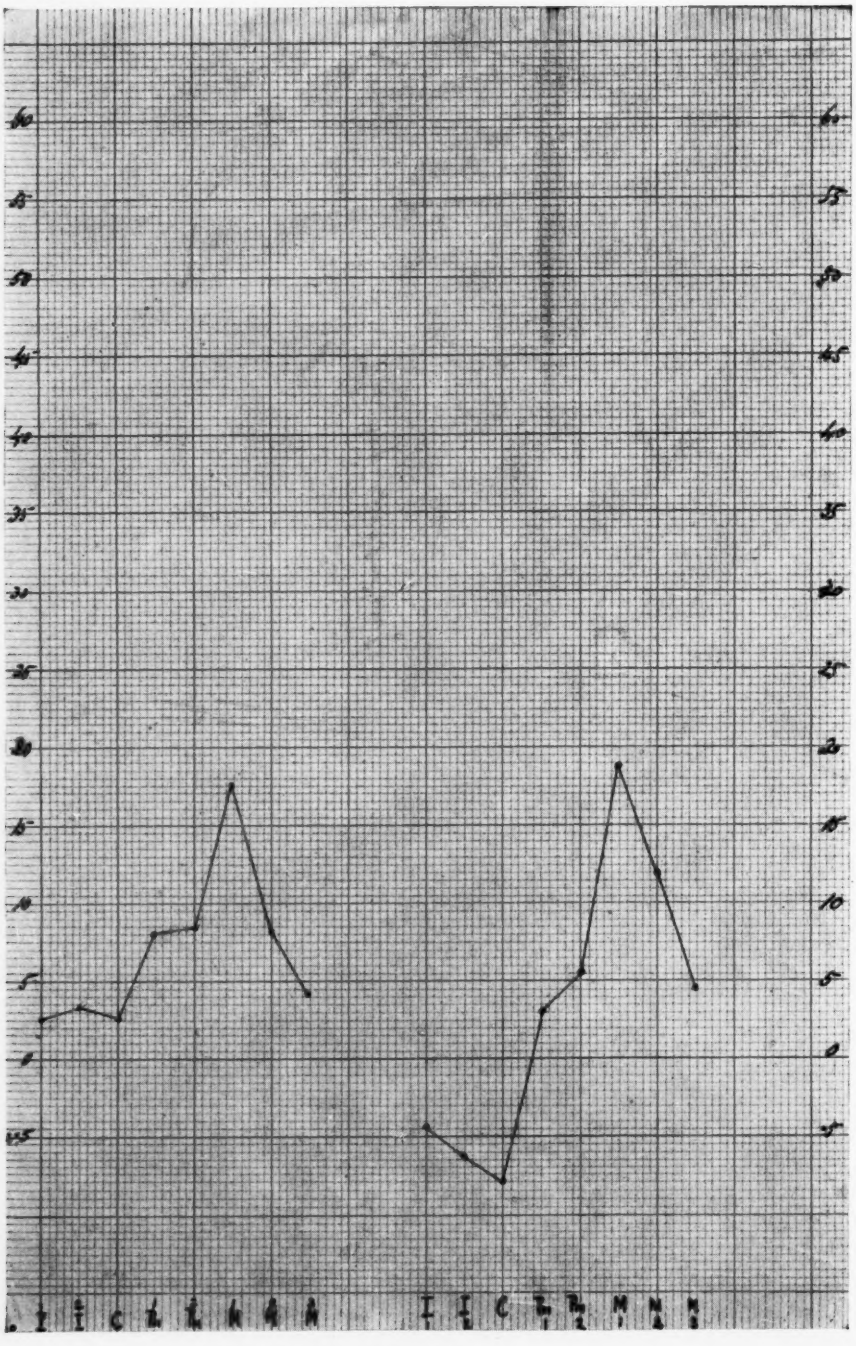


Chart II

Further, dental caries can be so closely imitated in almost every particular *in vitro* that the same condition, developed *in vivo,* cannot under the microscope be distinguished from it. Moreover, it cannot be induced by inoculation in the tissues of the teeth *in situ;* neither can carious dentine, when placed in an artificially prepared cavity in a sound tooth, infect the healthy dentine, or extend from a carious dead deciduous tooth to its unerupted successor beneath.

What is its origin? Something occurring in the mouth must be the cause.

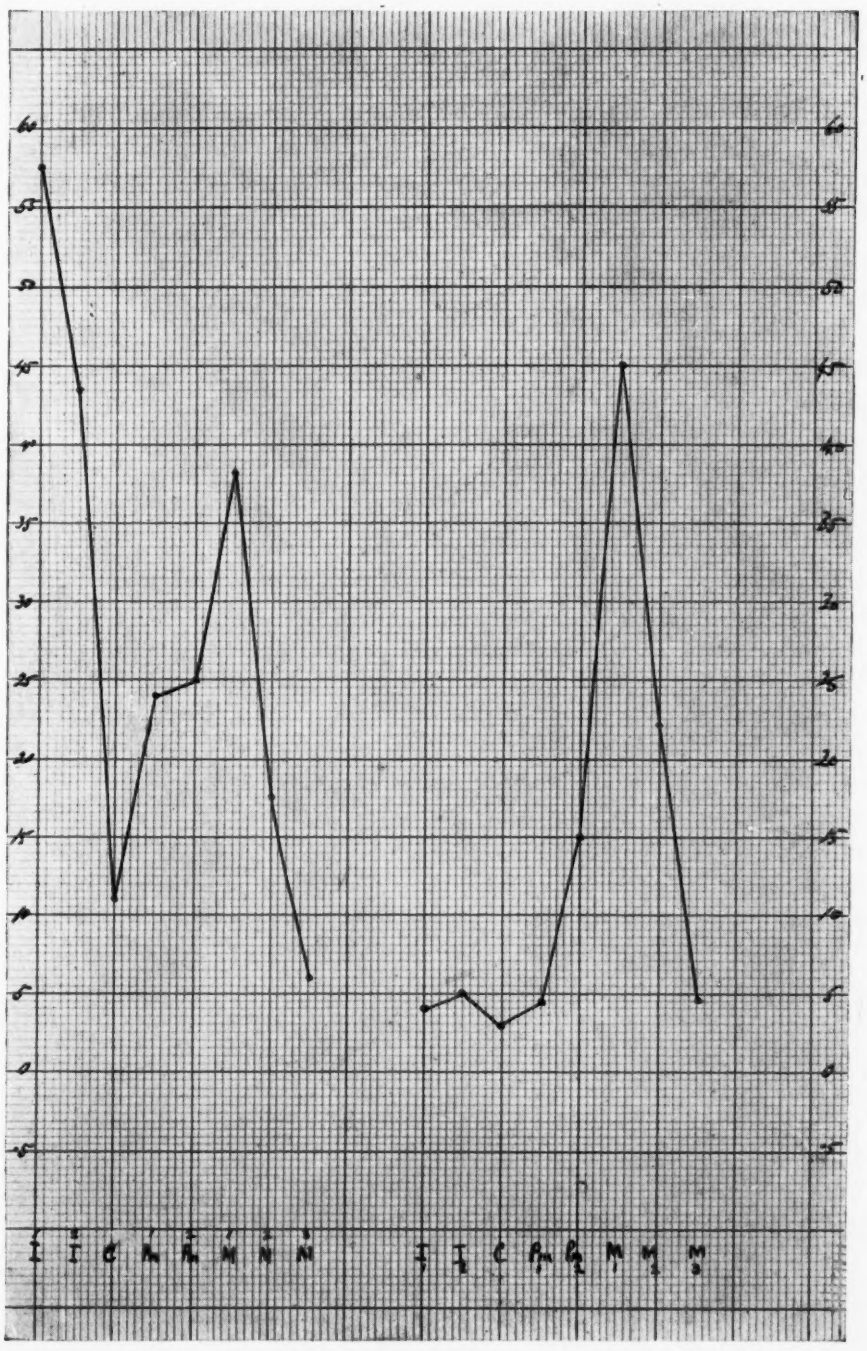


Chart III

The fermentation of carbohydrates in the food followed by the production of lactic acid, and possibly other acids, is today generally accepted as the exciting factor. Yet it should be well known that the growth and action of the oral flora are inhibited by the presence of an acid medium. Mouth bacteria develop on alkaline or neutral media. Paradoxical though it may appear, it follows, therefore, that it is almost certain that acid solutions of vegetable or chemical character will prevent its onset.

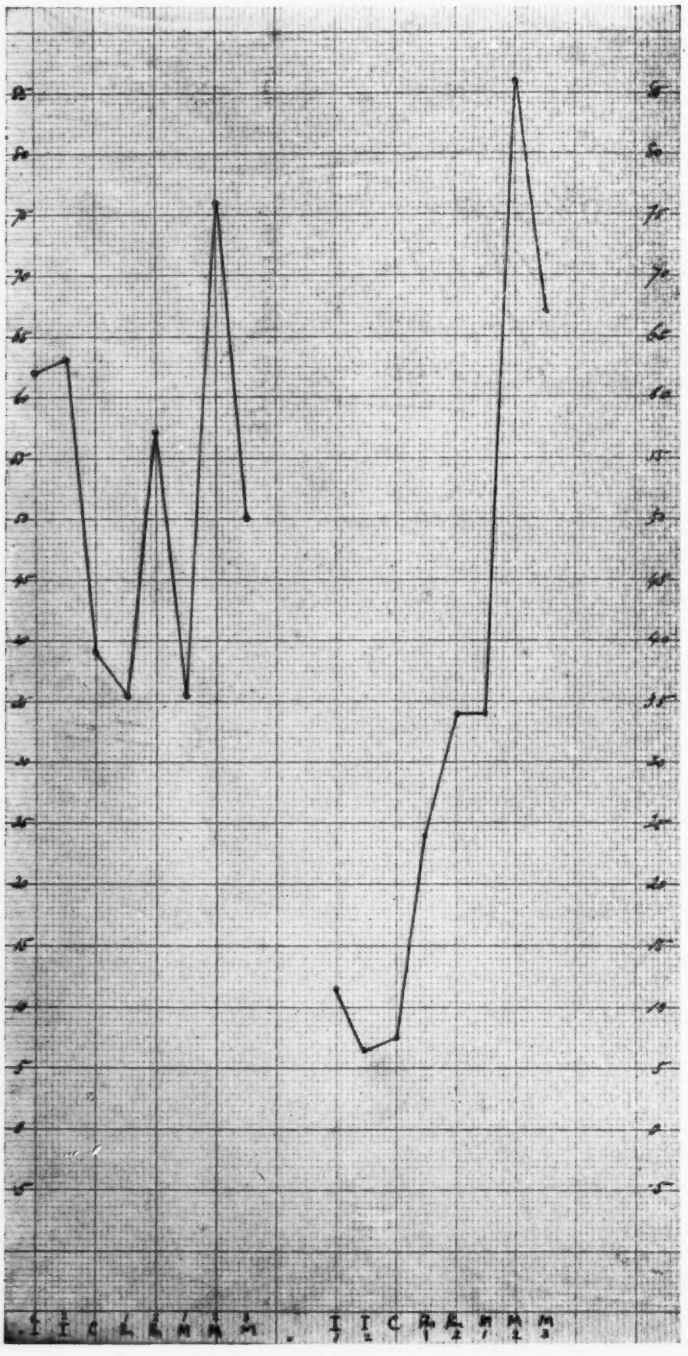


Chart IV

NEW DEFINITION OF CAUSATION

Dental caries may be considered to be a sign (or symptom) and a consequence, or result, of certain disturbances in the symbiosis, antibiosis, and commensalism of the flora of the mouth, occurring chiefly in early life, of which the precise nature is at present unknown. In other words, dental caries is a complication of the pathological condition produced by disharmonious relations existing at times between the various kinds of oral bacteria. Fuller investigations in this direction are greatly needed. The writer, however, believes the above to be the truth.

AGE INCIDENCE

It is a well-recognized fact that the closer he attains to adult life the less and less liable (''susceptible?'') to dental caries does an individual become, and therefore that dental caries is a condition of the teeth peculiarly associated with infancy and adolescence.

In response to inquiry submitted by the writer to a number of dental surgeons particularly interested in the matter, some time ago, why this should be, the following among other suggestions were offered: Children eat great quantities of sugar in the form of candy; infectivity; differences in constitution and character of the saliva or oral secretions predisposing to and facilitating lactic acid fermentation of carbohydrates; some teeth being physically and structurally more susceptible than others; congenital dental defects; the ''brittleness'' of newly erupted teeth; incomplete calcification of the dental tissues; children's illnesses; sugar diet; nonuse of substances such as ''coffee, tobacco, wine, spirits, etc.'' supposed by some people ''to neutralize the saliva,'' etc.

The following may be given today as the probable and common-sense reasons:

(1) The adult has a freer flow of saliva than the child, which, acting mechanically, washes away from Nasmyth's membrane and the surface of the enamel many bacteria in available positions. This copious flow of saliva is dependent on the excitation of the secretory nerves of the salivary glands, viz., the cervical sympathetic, glossopharyngeal, and *chorda tympani*—brought about largely by stimulation of food, muscular movements, presence of acids in the mouth, and the frequently occurring reflexes of the optic, olfactory and gustatory nerves. These are yet being developed in the child, whose glandular apparatus and activities of the organs of sense are as yet inexperienced.

(2) The process of phagocytosis is more effective at this period through the complete development and growth and proper functioning of the tonsils. It is extremely probable that the leucocytes in the mouth, which are phagocytic in function, are derived from the tonsils. Weakly children predisposed to tuberculosis often suffer from chronic hypertrophic tonsillitis. Here the process of phagocytosis is presumably impaired and fewer opportunities for combating and destroying harmful bacteria are presented.

(3) The physiologic resistance and defensive mechanisms of the mouth, as of the body generally of the adult, are greater than those of the child.

(4) The food of the adult is more complex and perhaps often somewhat more acid in character than that of the child. Generally speaking it is more

solid in substance. The caries-producing organisms become, therefore, incorporated into the bolus of food and carried into the stomach, where they are immediately destroyed by the gastric juice.

(5) The adult obeys the rules of oral hygiene more frequently and more effectively than the infant, using mechanical means for getting rid of caries-producing organisms by washing his mouth, drinking water or other fluids, cleansing with tongue and lips, as well as actually brushing the teeth.

The numbers of bacteria found in the secretions of the healthy oral cavity have been computed by F. W. Andrewes[8] as from ten to a hundred million per cubic centimeter. As the stomach and duodenum empty themselves properly after each meal, the former is well scoured and a large proportion of the oral bacteria swallowed perish during digestion, these two portions of the alimentary tract containing extremely few in a healthy state. But in the cecum and colon, in consequence of highly favorable conditions, the bacteria are enormously multiplied and their number as estimated per gram of normal excreta, range from a hundred to a thousand millions.

It is obvious that to diminish the occurrence of dental caries in childhood and adolescence, and prevent it at later periods of life, all effort should be made to reduce the number and to inhibit the growth and action of bacteria. This can be done equally well, if not better, by the free use of water and mechanical and muscular aids—brush, lips, tongue—than by the exhibition of antiseptic mouth washes, powders and soaps. An acid mouth wash is extremely desirable at times.

PYORRHEA ALVEOLARIS

Probably the next most discussed subject in dental pathology is that of pyorrhea alveolaris. Much confusion as to the nature of this condition exists. Contrary to dental caries, it is generally understood to be found exclusively in adult life. The writer has repeatedly seen it in children, as early as ten years, sometimes predisposed to by acute attacks of scarlet fever followed by severe and persistent anemia. Contrary to the accepted opinion, pyorrhea alveolaris is not a disease; it is, as the name implies, an exudation of pus from the gingival troughs. It is a symptom of oral sepsis, as it is also a symptom of dentoalveolar abscess and of catarrhal and mercurial stomatitis.

A SYMPTOM OF ORAL SEPSIS

With regard to the first-named oral condition, it may be the only sign. One of the reasons why there is so much mental confusion over this subject is because of the failure on the part of the dentist or physician to always recognize the nature of the exudative material at the gingivodental margins. If the microscope was more frequently brought into use in this connection alone, fewer mistaken diagnoses would be made. The observer jumps to conclusions too readily. The writer recalls the case of a man in midlife who apparently presented most of the signs of secondary (pernicious?) anemia, attributed by his medical man to pyorrhea alveolaris. The face, gums, lips, cheeks, tongue were practically colorless. The diagnosis was septic intoxication from pyorrhea alveolaris. The patient had no appreciable degree of oral sepsis; the pale

appearance of the mucous membrane and skin being really due, it ultimately transpired, to cancerous cachexia, for he died of a gastric carcinoma.

It is necessary to examine the exudate under the microscope before one can actually state that pus is present in such and such a case. It is equally necessary to make a blood count, preferably by means of an accurate and rapid method in which the Thoma-Zeiss pipette and microscopic slide are employed. In less than ten minutes the number of red and colorless blood corpuscles per cubic millimeter can be estimated.*

If examination of the gingival exudate and the making of a blood count were more frequently practiced much more satisfactory knowledge of the true nature and character of pyorrhea alveolaris would be accomplished.

Pyorrhea alveolaris may be regarded as a very simple symptom of a somewhat obscure disease of the oral cavity, viz., oral sepsis. If an infection of the mouth occurs and pathogenic organisms abound and perhaps predominate, pyorrhea alveolaris may become manifest, provided that local conditions are suitable.

LOCAL CONDITIONS PREDISPOSING TO PYORRHEA ALVEOLARIS

(1) Atrophy of the margins of the alveolar process, the result of anemia, and the unusual and in fact unique anatomic characteristics of the parts, and deepening of the gingival trough, is of great importance. The latter is associated with malocclusion, traumatism, infection from decomposing food, etc.

(2) A suitable nidus for the development of pyogenic organisms. The normal contents of the gingival trough, which generally extends from two to three or three and a half millimeters, are desquamated epithelial cells, saliva, débris of food, polymorphonuclear leucocytes and bacteria of the *Micrococcus Catarrhalis* and *Streptococcus* type.

In the early stage of this infection of a "pocket" the gums are normal or anemic and appear to be shrunken with the physiologically absorbed or atrophied bone beneath; pus exudes on pressure only; the teeth are not loose; the breath is foul, but there is *no pain.*

Later on a gingivitis is present, with or without periodontitis. The pockets are deep, pus is copious, the roots of the teeth are exposed and are themselves loose, but not painful unless the periodontal membrane is inflamed; the breath is foul.

---

*The enumeration of blood corpuscles can be obtained by the following method:

A certain amount of blood is drawn from the supposedly affected individual and diluted a known number of times with sodium sulphate solution of S. G. 1025.

The diluted blood is evenly spread on a special glass slide hollowed out on its upper surface and ruled in the center in a square measuring one square millimeter. This is subdivided into sixteen smaller squares, each of which is again subdivided into twenty-five very small squares. When a cover glass is placed over the cell 0.1 mm. deep each smallest square contains 1/4000th of a cubic millimeter of diluted blood.

Under the microscope the number of squares covered by the blood is ascertained, and the number of erythrocytes (red cells) and leucocytes which are easily recognized, noted. By means of the following formula an estimate of the number of corpuscles per cubic millimeter is accurately made: If A = the number of corpuscles counted, B, the number of squares counted, and C, the number of times the blood has been diluted:

$$\frac{A \times C \times 4000}{B} = \text{number of corpuscles.}$$

A normal blood count contains, per cubic millimeter, 5,120,000 erythrocytes and 7,000 leucocytes. If secondary anemia is suspected and exists, an examination will probably show erythrocytes 3,000,000 and leucocytes 23,000 per cubic millimeter.

DISEASES OF THE DENTAL PULP

Disturbances of the circulatory and nervous systems are the chief exciting causes of inflammation and degeneration, which sums up in two words the chief pathologic conditions of this all-important and vital organ.

The general predisposing causes may be grouped as due to (1) heredity, (2) sex, (3) age (the pulps of deciduous teeth, in addition to becoming inflamed, frequently undergo degeneration of a fibroid or calcareous type), (4) marasmus, (5) long-continued fevers.

LOCAL PREDISPOSING CAUSES

The local predisposing causes, based on the unique anatomical and physiologic characteristics of the pulp, are as follows:

(1) Absence of collateral circulation, which nullifies any attempts at reparative action or healing of parts or individual regions of the tissue.

(2) The valveless construction of the veins, thus inducing and favoring the production of venous hyperemia.

(3) Lack of an organized lymphatic system, carrying away waste products and inflammatory exudates.

(4) Its enclosure in unyielding walls of dentine, which thus injures it through accumulation of exudates.

(5) Absence of *direct* nervous control over its environment.

(6) Its constant subjection to rapid and extreme changes of temperature.

(7) The frequent presence of fillings, which are thermal conductors and alter the physical qualities of dentine.

(8) The frequent presence of adventitious dentine, which diminishes the cubic capacity of the pulp cavity.

(9) The early normal closure or complete formation of the apical foramina of the teeth themselves.*

All the above, severally or collectively, have a marked effect in the production of hyperemia and inflammation, with their varieties and terminations.

Recent observations completely confirm the existence, on clinical and physiologic grounds, of the segmental areas of the skin of the face, originally described by Prof. Henry Head,[9] as valuable aids to diagnosis. One is beginning to know something of the phenomena of odontalgia or neuralgia set up at times in teeth which have no recognizable lesion.

CAUSES OF OBSCURE ODONTALGIA

It can therefore be related that obscure causes of odontalgia may be ascribed to the following:[10]

(1) Increased or diminished blood pressure in the pulp.

(2) The presence of pulp nodules.

(3) Altered chemical constituents of the blood.

(4) Intraoral electrical impulses.

---

*The dates of "closure," or complete formation of the apical foramina of the individual teeth, are approximately: Maxillary first incisor, 11th year; maxillary second incisor, 11th year; maxillary canine, 13th year; maxillary first premolar, 12th year; maxillary second premolar, 12th year; maxillary first molar, 12th year; maxillary second molar, 15th year; maxillary third molar, 19th year; mandibular first incisor, 10th year; mandibular second incisor, 11th year; mandibular canine, 13th year; mandibular first premolar, 12th year; mandibular second premolar, 12th year; mandibular first molar, 11th year; mandibular second molar, 16th year, and mandibular third molar, 21st year.

(5) Reflex conditions associated with the gustatory and *chorda-tympani* nerves.

(6) Pathologic diseases of the Vth nerve.

(7) General neurasthenia and debility.

Finally in an important society such as this, whose members are chiefly concerned in the treatment of children, who can be watched more easily than their parents, many opportunities must arise for the prosecution of an investigation on some of the argumentative subjects briefly referred to above—researches of high value and of lasting benefit to dental science and the community at large.

REFERENCES

[1]Miller: Microorganisms of Human Mouth, 1887.
[2]Williams, Leon: Dental Cosmos, 1896 *et seq.*
[3]Goadby: Mycology of the Mouth, 1903.
[4]Black, S. V.: Operative Dentistry, i 1908.
[5]Walkhoff: Mikros. Atlas der Path. Hist. Mensch.
[6]Pickerill: Sixth Int. Dent. Congress, 1914.
[7]Eckermann: Dental Record, 1917.
[8]Andrewes: Trans. Roy. Soc. Med., 1913.
[9]Head: Brain, Part III, 1894.
[10]Hopewell-Smith: Normal and Pathological Histology of the Mouth, 1918.

DISCUSSION

Dr. M. N. Federspiel, Milwaukee, Wisconsin.—It seems to me, orthodontists who appreciate the prognosis of malocclusion, who can appreciate the difficulties they have to encounter, will sooner or later, if they have not at the present time, realize that in our science, or I might better say, in our branch of medicine; we must have a better understanding of the fundamental principles of histopathology.

I cannot go into the question of decay of the teeth, much as I would like to, because I am not prepared. I enjoyed Dr. Hopewell-Smith's remarks about the so-called pyorrhea alveolaris, and the importance of discriminating between the pathologic phases that occur.

I believe we have not been devoting enough time to the study of focal infection, and we must give more consideration to the pathologic phenomena that take place in the peridental membrane.

You have all heard him speak of granulomas. This mass is nothing more than a proliferation of connective tissue.

I wish I could discuss this scholarly paper in a better way, but I was not on the program, and had no opportunity to read this paper. However, this paper proves that when we have men like Dr. Hopewell Smith come before our society, it has a tendency to uplift orthodontia.

The President (Dr. Mershon).—It is very plain to me, gentlemen, that it is possible for men to become too highly specialized and forget there is any other department except the one they are directly working on and interested in. We must remember as specialists that we cannot treat just one organ, or deal with one particular part of an organ. We are concerned with mouth conditions at large. Dr. Hopewell-Smith has presented a phase of this subject in which we must be intensely interested.

I am going to throw the subject open for general discussion, and I hope the men will be prompt in what they have to say.

Dr. Milo Hellman, New York City.—Before I say anything, I should like to ask Dr. Hopewell-Smith to tell me whether I understood him correctly, that is, that caries is more prevalent in children than in adults. At what age do you mean that caries is more prevalent in children than in adults?

Dr. Hopewell-Smith.—From ten to twenty-five.

Dr. Hellman.—It is of interest to notice in what manifold ways evidence can be obtained that may be applicable to the phenomena of greatest interest to an individual. In studies on

growth in general, correlations may be made that add considerably to the appreciation of the interrelationship of various physiologic manifestations. Thus it is a well-established fact that the rate of growth reaches its highest expression during the fifth month in fetal life. From that time on there is a general decline until the period of pubescence. During puberty, growth is again accelerated to be followed by a gradual but constant retardation.

These accelerations and retardations have been studied in correlation with various physiologic manifestations. Thus, ossification of the carpus has been found to be in intimate relationship to growth as measured by height and weight. Also pubescence is closely associated with growth as is the process of teething. In a recent study as presented yesterday before this society, I have found that variations in occlusion stand in intimate relationship to growth.

From Dr. Hopewell-Smith's paper, I gather that also dental caries may be associated with growth. From figures kindly furnished me by Dr. Hopewell-Smith, it is evident that during the period of retardation in growth, there is an increase in dental caries. That is, there is an inverse correlation. Thus, from statistics collected by the British Dental Association about twenty years ago, the percentage of defective teeth, of children between 4 and 6 years of age is about 76.2 increasing to 86.8 between the ages of 7 to 9 when growth is at its lowest rate. With the acceleration of growth beginning at this age, there is a decrease in the manifestation of caries. Thus, between the ages of 10 to 12 the percentage of defective teeth drops to 83.9, and as growth begins to retard after puberty the percentage of defective teeth again rises to 85.9 at 13 to 15 years of age and shows its height of 93.6 at the ages of 16 to 18 years.

Another point of interest to me was the graphic representation by Dr. Hopewell-Smith of the frequency of caries in the different teeth in the same mouths. As you have noticed in his diagram, the figures demonstrating the frequency of occurrence of such decay assumed the form of the curve of probability. In my talk to you yesterday, I explained that all biologic phenomena must conform to this figure if scientifically treated. It is, therefore, of considerable gratification to me to see my arguments supported by the essayist's scientific procedure.

With reference to the origin of the osteoclasts, I am reluctant to accept Dr. Hopewell-Smith's contention that they are degenerated osteoblasts. According to Guido Fischer all manifestations in bone changes are preceded by a hypermia surrounding the affected region. This hyperemia is affected by a considerable increase in the number of capillaries. The capillary vessel walls thereafter disintegrate and the endothelial cells constituting them become independent cells metamorphosing into osteoclasts. The extensive histologic evidence brought out by Fischer is so convincing that it is difficult to depart from his views.

The effect of hyperemia in the oral cavity is of unusual interest when considered in relation to its effect on bone changes. As orthodontists, we are—or should be—greatly interested in the influence of normal and pathologic oral tissues upon the character of bone changes associated with tooth movement. According to the experiments of Dr. Albin Oppenheim, the artificial movement of teeth is accompanied by structural modifications in the bone tissues surrounding them. These modifications are definite and characteristic of the tissues involved and of the force exerted. Thus, gentle and continuous force brings about normal histologic changes while excessive force produces pathologic conditions without structural modification. Subsequent to tooth movement, there is a readjustment of the bone elements simulating previous conditions. But, although the bone spicules reassume their former orientation, there still remain areas of unossified bone surrounding them. Thus, by the assistance of a retaining appliance, the calcified portion exceeds the uncalcified zone, while when no retaining appliance is used the latter preponderates. It becomes, then, a question of considerable significance as to these manifestations under anemic and hyperemic conditions. The solution of future problems of the orthodontist will in a great measure depend upon a thorough knowledge of bone changes under physiologic and the various pathologic conditions encountered in the human mouth.

DEPARTMENT OF
ORAL SURGERY AND SURGICAL ORTHODONTIA

FOCAL INFECTION OF ORAL ORIGIN

By Samuel McClary, III, M.D., Philadelphia, Pa.

Associate Professor of Oral Surgery, Temple University; Instructor in Surgery, Post-Graduate School, University of Pennsylvania; Surgeon to The American Oncologic Hospital

THE IMPORTANCE which focal infection plays in the causation of systemic disease is becoming more apparent. A list which includes those diseases in which the relation has been definitely established and those in which foci of infection are thought to be important etiologic factors would cover many disorders, affecting nearly all organs of the body.

Among those diseases, whose definite relation to focal infection has been established, we may mention acute and chronic rheumatism, neuritis, acute and chronic nephritis, the cardiovascular diseases and chronic arthritis. Among the conditions in which focal infection is suspected to be an important etiologic factor are included: appendicitis, gall bladder infection, goiter, certain skin eruptions, anemia and bronchial asthma.

The principal regions in which we find foci of infection are the genito-urinary tract, the nasal accessory sinuses, the tonsils and teeth; consequently the oral surgeon and dentist should be alert in detecting these conditions in the mouth and know how best to correct them.

LATENCY OF INFECTION

Rosenow, in 1914, in *The Journal of Infectious Diseases* for January, states that the acute conditions are not so important and emphasizes the fact that the chronic conditions may remain unsuspected for a long time, and that it is the so-called blind abscesses and granulomata, which seldom give rise to noticeable symptoms, that favor the continuance of bacteria in these foci, which gradually increase in size and slowly produce absorption and disease of the adjacent bone substance.

In the *Journal of the American Medical Association* for September, 1916, Irons reports some interesting data bearing on this subject. In patients with

arthritic conditions 76 per cent had alveolar abscesses. In the group of cardiorenal 47 per cent had alveolar abscesses. Abnormal tonsils were found in 40 per cent of the arthritic cases and 24 per cent of the cardiovascular cases.

The effects of focal infection have been strongly impressed on the medical profession and the medical men are frequently censuring the dentists for improper care and treatment of oral infections; therefore it is necessary that the dentist improve his technic and study all cases carefully, so that both professions may come to some definite conclusions as to the best methods of treating certain oral conditions.

X-RAYS USEFUL IN DIAGNOSIS

One of the best means of aiding diagnosis is the use of x-rays by a competent operator, and the proper interpretation of these findings, and, better still, a series of radiograms during the course of treatment, so as to have a definite knowledge as to whether the case is progressing toward a cure or not. For example, an apical abscess, according to many dentists, can be cured by proper treatment without extraction of the tooth. A series of radiograms during, and subsequent to, the treatment would be of great value in determining what is the best method to follow. We personally doubt that most apical abscesses can be cured by drainage through the root canal; an apicoectomy may eradicate the infection, provided the abscess cavity is accessible and can be thoroughly curetted, but in many cases there is a pericemental abscess also, and it seems logical to a surgeon that the most certain method of cure is removal of the tooth and curettement of the alveolus.

There are many cases in which these apical abscesses remain dormant for a long time, and when for some reason the patient's resistance becomes lowered, the abscess assumes renewed vitality and produces systemic infection; therefore, when they are known to exist we should adopt measures to eradicate them thoroughly.

TREATMENT

The treatment of oral infections is both prophylactic and active. Prophylaxis should commence at birth and be continued throughout life. The nursing infant's mouth should receive scrupulous care; actively scrubbing it is unnecessary, flushing it out with normal salt solution or sterile water is advisable, but the important point to observe is to see that the breast, nipples and anything that enters the mouth is absolutely clean. During the period of dentition it is necessary to keep the teeth cleaned properly and at the same time not injure the mucous membrane. Proper breathing is essential and any pathologic condition that interferes with nasal breathing should be corrected, as mouth breathing is an important factor in oral sepsis. Cavities should be promptly filled and a dentist should be consulted at regular intervals.

The condition of the mouth in adults should be even more carefully regarded and in users of tobacco this is extremely important. The irritation of the gums and mucous membrane produced by tobacco predisposes to oral infection and recession of the gums.

The active treatment should consist in measures to restore diseased parts to normal conditions. Salivary calculi are probably responsible for the beginning of dento-alveolitis in many cases, and careful scaling at frequent intervals, in cases which have this deposit, is one of the best means to avoid oral infection. If the mouth condition has progressed so far that general symptoms are present, attention must be paid to both local and systemic manifestations.

The proper course to pursue in a patient suffering from a disease probably caused by oral infection may be outlined as follows: Have the tonsils examined by a competent laryngologist and removed if diseased. Procure good radiograms of all the teeth and their supporting structures, including the antrum, and then have these radiograms read by a competent person. If questionable areas are found a blood examination may be of some value, and in the differential count an increase in the polymorphonuclears from about 65 per cent to 72 per cent and over indicates infection. Now comes the important problem, and it must be decided whether the infection can be eliminated with retention of the teeth, or if extraction is indicated, with or without curettement.

EXTENSION TO ANTRUM

We must consider infections in the antrum, as 75 per cent of these come from diseased teeth. If careful examinations are made we will often find that the apices of one or more teeth project into the antrum, consequently abscesses at the apices of such teeth would subject the antrum to infection and we cannot cure the patient by simply treating the tooth.

Ballenger states that the maxillary sinus is more frequently affected singly than any of the other sinuses, because in one-half of the cases it is infected from the teeth rather than from the nose, whereas the other sinuses are infected from the nose. It is especially important for the dentist, radiographer and surgeon to cooperate in these cases where there is no evidence of alveolar abscesses, and the teeth should be tested with heat and cold and transmitted light to determine the condition of the tooth pulp. The socket of any diseased root that may be extracted should be carefully disinfected and explored with a sterile probe, in order to determine whether there is an entrance into the antrum, and if the infection extends into the antrum it is best to enlarge this opening and provide adequate drainage. Where there is no necrotic bone in the antrum and it is not filled with polyps, drainage through the alveolar process is usually sufficient, but when either of these conditions exists, it is best to do a radical operation such as removing the anterior wall of the antrum in the region of the canine fossa.

ETIOLOGIC IMPORTANCE OF TONSILS

The tonsils play almost as important a part in causing systemic infection as do the teeth, and as their structure is especially suited to retain infection and still show little or no evidence they are frequently overlooked. The recognition of an acute tonsillar infection is an easy matter, but it is the chronic cases without any marked symptoms in the tonsils that are frequently overlooked.

When the tonsils are much enlarged the presence of tonsillitis is easily determined, but an enlarged tonsil does not always mean an infected tonsil. We often see tonsils in children that distinctly project into the pharynx and do not advise their removal when they are superficial and do not lie embedded between the folds of the soft palate. In adults we usually advise the removal of large tonsils, as they should have undergone retrograde absorption before adult life and only inflammation would cause them to retain their abnormal size.

In children enlarged tonsils are often due to inflammation and generally there is a history of tonsillitis, and these tonsils are generally markedly congested.

When tonsils are embedded they may be explored by a hook made of a bent probe, especially if the patient is made to gag, as gagging tends to protrude the tonsils into the pharynx and it is easier to explore the pockets for cheesy secretions which indicate chronic inflammation. When we find that the surface of a tonsil and the anterior pillar is congested, more so than the remaining mucous membrane of the pharynx, we may feel reasonably certain that there exists a state of chronic inflammation.

INDICATIONS FOR REMOVAL OF TONSILS

I. In children when large enough to interfere with respiration.

II. In children who have suffered from a serious systemic infection, such as endocarditis or an acute nephritis following an attack of tonsillitis.

III. When there is a cervical adenitis and the tonsils show evidence of either acute or chronic inflammation.

IV. In all cases where there is a history of recurring attacks of tonsillitis.

V. In all cases where the tonsils are chronically infected, shown by congestion about the tonsils and the presence of cheesy concretions.

In adults the removal of the tonsils should be advised:

I. In all cases where there is a history of recurrent attacks of tonsillitis.

II. In cases in which the tonsils show signs of chronic inflammation, especially where there has been some systemic infection.

III. In cases which show marked evidence of chronic inflammation, even though the patient has no systemic infection or local discomfort.

We cannot promise the patient that removal of the tonsils will always cure a systemic infection, but we should explain to him that the chances are that his condition will be improved by this procedure. This will also apply to infections in the antrum and around the teeth. The pathologic condition should not be present and its existence is sufficient reason for its elimination.

OPERATION FOR REMOVAL OF TONSILS

The practice of using a tonsillitome and amputating the tonsils has proved inadequate, as frequently the infection persists in the remaining tonsillar tissue and the patient has as much or more trouble than before operation. Complete excision of the tonsils is necessary, and for this purpose they must be dissected free from the pillars and are best removed with a snare. The Sluder instrument works well in removing tonsils that are not buried, but we have frequently

seen secondary hemorrhage following its use, and as it can be used only in selected cases, we feel that the snare is the most satisfactory and safest instrument.

Hemorrhage is seldom troublesome and is usually controlled by pressure or the application of a hemostat for a few minutes; all cases should remain in the operating room under observation for at least ten minutes after the operation is finished and hemorrhage is controlled.

The blood pressure should always be taken before operating on an adult, as high blood pressure increases the danger of hemorrhage. In both adults and children hemophilia must be eliminated and in any case with a suspicious history the coagulation time should be determined, and if it is delayed, proper measures should be taken to correct it before operation.

CONCLUSIONS

Defective teeth reduce physical efficiency. Dirty, suppurating mouths and other foci of infection are frequently responsible for many cases of rheumatism and other chronic affections. The dentist is no longer concerned solely with the repair, treatment, and replacement of teeth. He is concerned more seriously with his patient's health and life.

There should be cordial cooperation between the surgeon, the internist and the dentist in the treatment of these cases, as even with the most careful study many of them are obscure.

DEPARTMENT OF
DENTAL AND ORAL RADIOGRAPHY

CLINICAL VALUE OF THE ELECTRIC TEST FOR PULP VITALITY

BY HOWARD R. RAPER, D.D.S., INDIANAPOLIS, IND.

Formerly Professor of Radiodontia, Materia Medica and Operative Technic, and Junior Dean, I. D. C.

THERE are many sorts of cases in which the electric test for pulp vitality may be applied to great advantage by the diagnostician. It is not possible to mention all the circumstances under which its application will prove helpful, and, if it were, the mere mention of such circumstances and cases would fail to impress the reader or teach him so effectively as the illustrated description of cases.

Nevertheless, some written effort to indicate the extent of the value of the test seems necessary and is set forth in this chapter.

The following is a list of cases and circumstances in which and under which the test may be used to advantage:

(1) In cases of somatic disease to determine which teeth are most suspicious. (2) Where no x-ray machine is available. (3) To check all x-ray findings. (4) To find teeth with dead pulps which could not be found by any other means. (5) To find abscesses which might otherwise be overlooked because they fail to show in radiographs made at certain angles. (6) To assist in recognizing very slight osteoclasia. (7) To avoid mistakes when the end of a root and an abscess cavity (with no connection between the two) overlap in the radiograph due to the angle at which the exposure is made. (8) To avoid misinterpretation when the abscess cavity laps to the lingual or facial of the adjacent teeth. (9) To differentiate between the mental foramen and an abscess cavity. (10) To differentiate between the anterior palatine, or incisive, foramen and an abscess cavity. (11) To differentiate between the antrum of Highmore and an abscess cavity. (12) To differentiate between the somewhat radiolucent area which

sometimes appears in the apical region of upper lateral incisors, due to the canine, or incisal, fossæ, and radiolucence caused by infection and pathologic bone change. (13) To differentiate between nostril spots and abscesses. (14) To aid in the recognition of nasal fossæ spots as such. (15) To aid in the recognition of the inferior dental canal as such. (16) To differentiate between a very small abscess cavity and an unusually large periapical space. (17) To differentiate between a cancellous spot of unusual appearance and an abscess cavity. (18) To assist in differentiation between pathologic and physiologic conditions about the buccal roots of the upper molars. (19) To assist in differentiation between an absorbed, roughened root and a radiograph made with the rays directed through the tooth diagonally from facial to lingual. (20) To differentiate between partially formed root and an abscess. (21) To determine how many teeth are involved in an abscess. (22) To assist in differentiation between dentoalveolar abscess and peridontoclasia (pyorrhea).

1. IN CASES OF SOMATIC DISEASE TO DETERMINE WHICH TEETH ARE MOST SUSPICIOUS

The determination of which teeth are most suspicious aids in many ways. If the cost of examination is to be cut to the minimum those teeth which respond perfectly to the test need not be radiographed. And even if all of the teeth are to be radiographed, those which respond to the electric test need not be radiographed or studied with such care as those which cannot be tested or test negatively. Thus the number of negatives it is necessary to make is reduced and at the same time the operator's attention is directed to those parts where make-overs are most likely to be indicated.

It is always the part of wisdom to avoid unnecessary x-ray exposure, and in some emergency cases where the operator happens to be operating with inadequate protection this is especially true.

Much has been said of x-ray pictures relieving the operator of the necessity of working in the dark. The electric test relieves the x-ray operator himself from the handicap of working in the dark and so enables him to make a better examination.

In cases of systemic disease examination of the mouth for infection is made in one of three ways: (1) All teeth and all parts of the mouth are radiographed. (2) All teeth which do not react positively to the electric test, or cannot be tested, all regions from which teeth are missing, and all teeth affected, or thought to be affected, with pyorrhea and all regions of unusual appearance are radiographed. (3) The teeth which react negatively and those which cannot be tested are radiographed.

For the reasons already given, the writer applies the electric test even if all the teeth are to be radiographed and whether it is permissible to eliminate parts of the mouth from the necessity of examination at all or not depends on two things: The operator's judgment and the electric test.

When the examination is for pulpless and abscessed teeth only, those regions in which the teeth respond perfectly and positively to the test need not be radiographed. When the examination is more inclusive, such regions may be radiographed and may reveal such lesions as carious cavities, overhanging fillings, incipient pyorrhea, odontomata, and supernumerary teeth.

Where we speak of the application of the test we assume that its application is made in a competent, intelligent manner, for unless this is the case, the electric test, like all tests under similar circumstances, is useless.

2. WHERE NO X-RAY MACHINE IS AVAILABLE

Where no x-ray machine is available the only way to determine which teeth are pulpless with any degree of accuracy is to use the electric test. This will, in most cases, enable the operator to locate the pulpless teeth quite successfully. A friend who "believes in the extraction of all pulpless teeth" maintains that the determination of which teeth are pulpless is all that is necessary and that if this can be done with the electric test then radiographs are unnecessary. He fails to consider the value of the radiograph to verify his electric test findings, and, further, the radiograph, by showing the amount of bone destruction, assists in curettement, so it helps even the extreme extractionist. It is necessary to remove shell crowns before the teeth carrying them can be tested. Where we have the combination of a seriously sick patient and no x-ray machine available, the test may be used to locate the pulpless teeth. Thus extraction of teeth with vital pulps may be avoided and at the same time all periapical infection is eliminated.

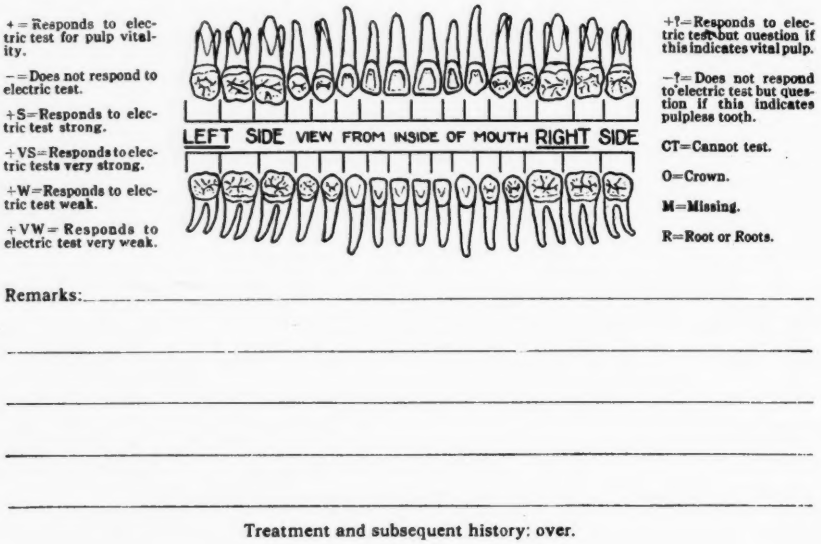


Fig. 1.

3. TO CHECK ALL X-RAY FINDINGS

Both the electric test and radiograph are quite susceptible to error—to misinterpretation let us say—but taken together, letting the one check the other, chance for error if not entirely eliminated, is reduced to an agreeable minimum.

The writer started to use the electric test in his practice of radiodontia in selected cases and came gradually to use it in all cases. It is my practice now to apply the test first, in all cases where radiographs are to be made, *and to make records of the results of the application of the test* on the chart illustrated

in Fig. 1. From the records on the electric test chart, the recorded history of the case, and the finished, mounted radiographic negatives, a diagnosis and prognosis are given.

In cases where a tooth is suspected of being pulpless or abscessed and an x-ray examination is to be made of such a tooth the writer makes it an invariable rule to test at least the two teeth approximating the one under examination.

4. TO FIND TEETH WITH DEAD PULPS WHICH COULD NOT BE FOUND BY ANY OTHER MEANS

A tooth with (as yet) no periapical bone change, or filling material in the pulp chamber or canals that has a dead pulp cannot be located by means of radiographs. Such teeth may be found by the use of the electric test. When the symptoms (there may or may not be symptoms) are such as to place a certain tooth under suspicion the electric test *will assist* in diagnosis.

5. TO FIND ABSCESSES WHICH MIGHT OTHERWISE BE OVERLOOKED BECAUSE THEY FAIL TO SHOW IN RADIOGRAPHS MADE AT CERTAIN ANGLES

Let us consider a hypothetic case, the like of which is frequently met. A radiograph is made of a certain tooth. It shows no abscess and no canal filling. but the electric test for this tooth is negative. Also perhaps there are abscess symptoms, a fistula in the vicinity. Another radiograph is made at a different angle and shows osteoclasia. Thus an abscess cavity is found which, had it not been known that the tooth did not have a vital pulp, would have been overlooked.

Foreshortening of the upper teeth may result in the failure of an existing abscess cavity to show. Slight elongation is sometimes advantageous; it enables the operator to see abscess cavities which might otherwise be overlooked.

6. TO ASSIST IN RECOGNIZING SLIGHT OSTEOCLASIA

An area of osteoclasia may be so small that one is unable to say definitely whether it is really osteoclasia or not. In such cases, whether the pulp is vital or not may be the deciding factor. If the pulp is vital, of course the suspicious area is not a bone change due to infection, but, if the pulp is not vital, a suspicious area can be classed as osteoclasia due to infection, especially if there is some osteosclerosis also.

7. TO AVOID MISTAKES WHEN THE END OF A ROOT AND AN ABSCESS CAVITY (WITH NO CONNECTION BETWEEN THE TWO) OVERLAP IN THE RADIOGRAPH DUE TO THE ANGLE AT WHICH THE EXPOSURE IS MADE

When a tooth seems to be involved in an abscess, but responds to the electric test, it is sometimes possible to make radiographs at different angles which will show that, after all, the suspected tooth is not involved in the abscess cavity. If a root end is more or less surrounded by an abscess cavity it will register in radiographs, if at all, at the end of the affected tooth. But if the abscess cavity is at the side of the root, and the root end only appears to be involved in the abscess due to the angle of the x-rays, a shadow of the abscess cavity can usually be cast on the film away from the root end.

The electric test thus indicates the expediency of making more radiographs at different angles in such cases and keeps the operator from accepting false radiographic evidence. See Figs. 2 and 3.

Abscesses arising from the lingual roots of upper bicuspids not infrequently have the radiographic appearance of involving the cuspid and lateral incisor. This appearance of involvement in the radiographs may be due to actual lapping of the abscess cavity to the lingual of the cuspid or lateral or may be due to the angle at which the exposure is made.

8. TO AVOID MISINTERPRETATION WHEN THE ABSCESS CAVITY LAPS TO THE LINGUAL OR FACIAL OF THE ADJACENT TEETH

It is possible for an abscess cavity to lap to the lingual or facial of the roots of the adjacent teeth in such manner that healthy teeth have the appearance of being involved in the abscess. In such cases the electric test is often the deciding factor and so of the utmost importance.

This lapping of an abscess cavity is most likely to occur to the lingual in the upper teeth. Cysts, as well as abscesses, may lap to the lingual or facial of healthy, uninvolved teeth.

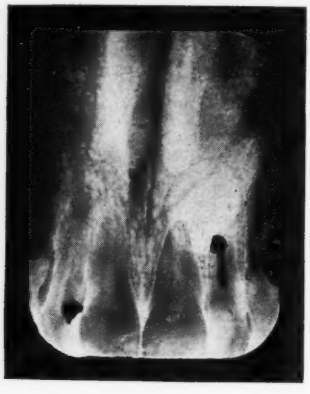


Fig. 2.

Fig. 3.

9. TO DIFFERENTIATE BETWEEN THE MENTAL FORAMEN AND AN ABSCESS CAVITY

The fact that the mental foramen may have the appearance of being an abscess of the first or second (usually second) lower bicuspid has become common knowledge. Such common knowledge in fact that the writer has seen an abscess cavity mistaken for the mental foramen!

Where the electric test can be applied and is positive, the operator may know that a radiolucent area at the apex of a lower bicuspid is the mental foramen. Where the response to the test is negative, the operator should look elsewhere in his radiograph to locate the mental foramen. It is sometimes best to make an extraoral radiograph for this purpose.

Where the result of the electric test is definitely positive all doubt is immediately and completely removed.

10. TO DIFFERENTIATE BETWEEN THE ANTERIOR PALATINE, OR INCISIVE FORAMEN AND AN ABSCESS CAVITY

As with the mental foramen, the fact that the palatine foramen may be mistaken for an abscess is becoming so well known that there is danger of abscesses being mistaken for the anterior palatine foramen. And, as in the case of the mental foramen the electric test, when positive, enables the operator to make a prompt and accurate diagnosis.

When the test is negative an intraoral radiograph may be made in such manner as to cast the shadow of the palatine foramen between the roots of the central incisors, instead of the apex of the root of one of them.

I have mentioned it before but it is of sufficient importance to justify repetition: *When a radiolucent area can be cast away from the end of the root, it is not an abscess involving the end of the root.*

11. TO DIFFERENTIATE BETWEEN THE ANTRUM OF HIGHMORE AND AN ABSCESS CAVITY

One familiar with the appearance of intraoral dental radiographs does not often have a great deal of difficulty in distinguishing the difference between the antrum of Highmore and an abscess cavity, but one less skilled in interpretation often has a great deal of difficulty in this respect. And even one skilled in interpretation will feel much more secure in the accuracy of his opinion if he verifies it by applying the electric test and finds that the pulps of the bicuspids and molars are vital.

Some points of difference between the radiographic appearance of the antrum of Highmore and an abscess cavity are: Of course abscess cavities are usually not nearly so big as the antrum, but a small antrum may be much smaller than a very large abscess. The outline of the antrum is more symmetrical, less jagged, than the outline of an abscess cavity, as a rule. Also the outline of the antrum is rimmed with a thin radiopaque line, representing the walls of the antrum.

12. TO DIFFERENTIATE BETWEEN THE SOMEWHAT RADIOLUCENT AREA WHICH SOMETIMES APPEARS IN THE APICAL REGION OF UPPER LATERAL INCISORS, DUE TO THE CANINE, OR INCISAL FOSSÆ, AND RADIOLUCENCE CAUSED BY INFECTION AND PATHOLOGIC BONE CHANGE

This seems to the writer to require no special explanation. As always the value of the electric test hinges on the fact that a tooth with a vital pulp cannot be abscessed.

13. TO DIFFERENTIATE BETWEEN NOSTRIL SPOTS AND ABSCESSES

Like other things which cause radiolucent areas at the apices of the roots of teeth without actual involvement of the ends of the roots of the teeth, a nostril spot may be cast away from the end of the root by changing the angle of the x-rays.

14. TO AID IN THE RECOGNITION OF NASAL FOSSÆ SPOTS AS SUCH

Nasal fossæ spots are so characteristic in appearance that it is only occasionally that one is found which really resembles an abscess cavity. Dr. Noboru Teruuchi points out the fact that bilateral abscesses of similar size and shape, arising from the apices of the roots of the laterals, or centrals, might be mistaken for nasal fossæ spots.

15. TO AID IN THE RECOGNITION OF THE INFERIOR DENTAL CANAL AS SUCH

The inferior dental canal is characteristic in appearance to the operator familiar with radiograms, but may be mistaken for a pathologic lesion by one less familiar with the appearance of dental radiographs. A positive reaction from the application of the electric test would relieve uncertainty in some cases.

16. TO DIFFERENTIATE BETWEEN A VERY SMALL ABSCESS CAVITY AND AN UNUSUALLY LARGE PERIAPICAL SPACE

By periapical space the writer does not mean either an air space or a vacuum, but a space between the root end and the bone; a space doubtless filled with vascular tissue.

In the past there has been some discussion as to whether such spaces exist. I have seen them, and they resemble a small abscess cavity. One cannot confuse a large periapical space with a small abscess if the electric test is applied and the pulp found vital.

As further aids in differential diagnosis I may say that osteosclerosis is likely to occur in case of the abscess and that the lamina dura can probably be seen unbroken in the case of the large periapical space.

17. TO DIFFERENTIATE BETWEEN A CANCELLOUS SPOT OF UNUSUAL APPEARANCE AND AN ABSCESS CAVITY

In some cases the cancellous openings in the bone are abnormally large and I have seen them mistaken for abscesses. Such a mistake could not occur if the electric test were applied and the pulps of the suspected teeth found vital.

18. TO ASSIST IN DIFFERENTIATION BETWEEN PATHOLOGIC CONDITIONS AND PHYSIOLOGIC CONDITIONS ABOUT THE BUCCAL ROOTS OF UPPER MOLARS

When the parts are in a state of perfect health there is nevertheless sometimes radiolucent areas at the apices of the buccal roots of the upper molars. Also the distobuccal root of the upper molar is so small that it sometimes fails to show clearly in radiographs and leads the uninitiated to believe that there is root absorption. When the fact that the pulp in the tooth is vital can be established by the application of the electric test uncertainty in x-ray interpretation can be eliminated.

19. TO ASSIST IN DIFFERENTIATION BETWEEN ABSORBED, ROUGHENED ROOT AND A RADIOGRAPH MADE WITH THE RAYS DIRECTED THROUGH THE TOOTH DIAGONALLY FROM FACIAL TO LINGUAL

When a radiograph of the upper bicuspids is made with the rays passing diagonally through the teeth, the roots of the teeth in the radiograph not in-

frequently have a fuzzy, indistinct appearance. I have seen this appearance of the root mistaken for absorption of the root. Since the roots of vital teeth do not absorb, except in the most extraordinary cases, or in cases of pressure from unerupted tooth bodies, the establishment of the fact that the pulps are vital by means of the electric test eliminates all except the remotest possibility of root absorption.

In the case of the upper bicuspids the small roots sometimes fail to show distinctly and so may seem to be absorbed, like the distobuccal roots of upper molars.

20. TO DIFFERENTIATE BETWEEN PARTIALLY FORMED ROOT AND AN ABSCESS

If the fact that the pulp is vital can be established by means of the electric test, this mistake cannot occur. It is less likely to occur with the dentist who will take into account the age of the patient.

21. TO DETERMINE HOW MANY TEETH ARE INVOLVED IN AN ABSCESS

The writer recalls the first very large abscess he encountered in which five teeth were involved. By checking up the x-ray findings with the electric test and finding that those teeth which seemed to be abscessed did not respond to the electric test I felt much more certain of my diagnosis than I could have otherwise.

22. TO ASSIST IN DIFFERENTIATION BETWEEN DENTO-ALVEOLAR ABSCESS AND PERIDONTOCLASIA (PYORRHEA)

When serumal calculus on the roots of a tooth causes irritation, which in turn produces inflammation, and which in its turn results in suppuration, and the pus happens to penetrate the external alveolar plate, instead of following along the side of the root and discharging at the neck of the tooth, the clinical picture is almost identical with that of an abscess. But if the electric test shows that the tooth under suspicion of being abscessed has a vital pulp then the seat of the suppurative process may be looked for along the side of the root instead of at the apex.

ABSTRACT OF CURRENT LITERATURE

Covering Such Subjects as

ORTHODONTIA — ORAL SURGERY — SURGICAL ORTHODONTIA — DENTAL RADIOGRAPHY

It is the purpose of this JOURNAL to review so far as possible the most important literature as it appears in English and Foreign periodicals and to present it in abstract form. Authors are requested to send abstracts or reprints of their papers to the publishers.

Intermaxillary Wiring. J. D. Eby. The Journal of the National Dental Association, 1920, vii, No. 9, p. 771. (Illustrated.)

Two methods of intermaxillary wiring, described by the author and explained by a number of illustrations, have in his experience proved universal in application, have eliminated all the objections of other designs, and have added in exchange many desirable qualities. The great satisfaction of the first method lies in the facts that: (1) There is no bulk of wire; (2) the wire may be quickly cut; (3) they may be tightened daily with ease to the operator; (4) they rarely break; (5) if a wire breaks, it may be replaced without material injury to the others. The second method possesses all of the advantages of the preceding method, with the following additions: (1) If a patient is to receive an anesthetic, these wires may be placed so that the mouth may be left open until the danger of nausea is passed. (2) The tie wires may be cut in order to test the fracture and if it is found that solidification is not complete, they may be immediately replaced without all the necessary work of starting from the beginning.

Regarding the ordinary methods of immobilizing fractures of the mandible by means of intermaxillary wiring, the author points out that the general plan of procedure is usually clumsy, full of danger, tedious to insert, easily loosened, difficut to tighten, easily broken, hard to repair and usually attended with harassing trouble to the operator, pain to the patients, the results of which usually make it necessary to retain the wires longer and not infrequently inviting complications which may partake of a very serious nature. The description of the author's improved methods is supplemented by instructive figures showing intermaxillary wiring for postelevator fractures, for postdepressor fractures, and for multiple fractures of the mandible. The best materials to be found for the purpose are the large sizes of Angle's ligature wire or 22 G. pure annealed copper wire.

Structure and Development of the Dental Tissues. E. Retterer. La Revue de Stomatologie, 1920, xxii, No. 8, p. 437.

In all vertebrates, the dental anlage begins as an epithelial organ. Serving for the formation of the enamel, this predental organ governs the special development of the connective tissue cells of the papilla on which it rests. Under

its influence, the superficial cells of the papilla become hypertrophied and proceed to form the ivory and the enamel (odontoblasts and adamantoblasts). The peripheral extremities of the odontoblasts undergo a differentiation into hematoxylinophile fibrils and hyaloplasm. The fibrils are prolonged into the most superficial layers of the dentine and the enamel; the hyaloplasm becomes transformed, in the interval of the fibrils, into a reticular framework in which lime salts are deposited. When the mechanical action is weak or absent, the dentin persists in this condition and wears out before producing enamel; when the tooth acts only by its borders and serves only for cutting, the borders become covered with enamel, whereas the remainder of the surface presents nothing but dentin (incisors of ruminants). When the free portion or crown of the tooth serves for grinding, the enamel covers the entire triturating surface. This enamel is at first made up by a layer, the structure of which resembles that of the enamel of cutting teeth, but as the middle and outer layers become progressively richer in calcium salts, the external portions of the enamel are finally formed by a substance in which the mineral elements predominate. The enamel is accordingly not a tissue or a definite substance; there are as many varieties of enamel as there are degrees in the mechanical stimulation exerted upon the tooth.

Orbital Phlegmon Following Dental Extraction. Gerson. Zahntechnische Rundschau, 1920, No. 36, p. 416.

Diseases endangering life are a very uncommon sequel of dental measures, and the author accordingly wishes to report a case where a grave orbital phlegmon developed as a sequel of extraction, fortunately terminating in recovery. The patient, a woman twenty-eight years of age, was admitted to the hospital for a painful swelling of the upper jaw and left cheek, which had appeared two days after a small incisor tooth had been filled following avulsion of the nerve. On examination of the mouth cavity, the entire mucosa of the left upper jaw was seen to be badly swollen and ragged; highly offensive thick pus came from the alveolus. The bone was palpable. No empyema of the maxillary antrum. The diagnosis was facial phlegmon, due to otitis of superior maxilla, (phlegmonous erysipelas). Deep incisions were applied along the nose and lip, but did not permanently relieve the swelling, which progressed towards the temporal region and towards the inner ocular angle, to the forehead and the other side of the face. The old incisions were extended into the surrounding inflamed tissue, and deep incisions were applied down to the periosteum, through the lower eyelid, in the upper lid, on the forehead, with crenation of this yellow pus under a high pressure. The eyelids again became edematous, opacity of the cornea appeared, and within a week after the last operation, there was panophthalmia of the left eye, with progressive protrusion of the eyeball. The inner ocular angle of the other eye was likewise inflamed and swollen; the right conjunctiva was slightly edematous. Operation was performed in the form of typical evisceration of the eyeball (abscess of vitreous), followed by inspection of the old incisions, which showed that infection led from the cheek deeply into the orbit. Evisceration of the orbit was accordingly added; the orbital contents were found to be interspersed with numerous abscesses also

the retrobulbar fat-tissue. The operative sequelæ were favorable, and the patient remained free from meningitic symptoms. One month later she could be discharged into ambulant treatment.

A review of the literature showed that nearly all cases which begin in this way (infection following extraction of upper incisor teeth) terminated fatally, probably due to the course of the infection. This may travel by several routes, first through local propagation, i. e., continuation of the inflammatory process from the maxillary periosteum to the orbital periosteum; second, through propagation across the soft parts, as in the author's case; third, by metastasis. In the above described patient, the infection was carried through the blood vessels and lymphatics of the buccal mucosa, in the form of an extensive erysipelatous soft parts phlegmon. This mode of infection would seem to be the most dangerous, involving more frequent and rapid possibilities for propagation and meningitic manifestations. Timely radical operation saved the patient's life and the vision of one eye. Although grave complications rarely follow the extraction of teeth, their appearance in a given case, calls unconditionally for the performance of a radical operation, in order to ensure a favorable outcome.

Remote Results in Three Cases of Bone-Graft of the Lower Jaw. Julliard. Schweizerische Medical Wochenschrift, 1920, No. 25, p. 492.

The author reports three observations on bone-grafts dating back eighteen months or longer. These operations were performed in Germany, on French prisoners, by experienced surgeons and even by specialists, under the best clinical conditions, but the results serve to show that this method, which by many is considered as the best at our disposal, still leaves much to be desired. Reexamination of three soldiers, 23, 21, and 32 years of age, respectively, at the end of one year and a half to two years, showed that bone grafts of the lower jaw at any rate, do not always permit sufficient guarantees of solidity. Bony apposition is absent; there is no augmentation of the transplanted tissue. The old bone should have disappeared and been replaced by new bone, but at the end of eighteen months and two years, this process had not been terminated in grafts a few centimeters in length. No matter if the graft be supported by an apparatus or exposed to regional stimulation through strain, rarefaction sets in and mobilization takes place at one of its extremities. However, these observations are not yet sufficiently numerous to permit general conclusions unfavorable to bone grafts, and other results, in other regions of the body, must still be waited for. An improvement on bone-grafting may perhaps be found in osteo-periosteal grafts, which yield excellent immediate results, but the remote and permanent results of which still remain to be established. The application of this method is easy, the affected region promptly consolidates, and a resistant mass is formed; the callus is soft at first, but then becomes hard and demonstrable by radiography. The osteo-periosteal graft method has been repeatedly adopted by the author in his recent practice, so far with highly favorable results.

Adenoma of the Velum of the Palate. Portmann. Bulletins de La Societe Anatomeque de Paris, 1920, No. 2.

Glandular tumors of the palatine velum are among the rarest benign growths met with in this region. The author was recently enabled to observe an

illustrative case in a woman 45 years of age, who had noticed the presence of a small tumor on the right side of the palate, for about five months past. This tumor had progressively enlarged, up to the size of an apricot pit, but without producing important functional disturbances. The growth protruded into the mouth and pharynx, its indistinct borders vanishing in the healthy adjacent tissues. The mucosa was raised, but smooth and fairly even on its surface, without a change in color. There was no glandular enlargement. The tumor was removed under local anesthesia, and proved to be very adherent to the deeper layers. Immediate suture was applied, and normal cicatrization followed. On microscopic examination, the tumor was found to consist of hyperplastic epithelial glandular tissue; it represented a series of acinous glands much richer in secretory culdesacs than seen in the normal structure of the glandular apparatus of the palatine velum. The acini were generally larger than in the normal condition. The connective tissue strands were arranged in a very loose-meshed network, and not extensively developed. Numerous small cells could be seen around the vessels and massed in foci. The tumor accordingly answered the description of a typical adenoma of the velum of the palate. Clinical examination permits no distinct differentiation between adenoma, adenosarcoma, or even sarcoma, although one or the other of these affections may be suggested by the configuration, consistence, or the condition of the mucosa. Histologic examination alone removes all doubts and usually shows the presence of a mixed tumor. A pure adenoma of the palatine velum is of exceptional occurrence, and for this reason the above case is worthy of report.

Premature Caries of Upper Incisors. A. Feil. La Progress Médical, 1920, No. 35, p. 382.

Attention is called by the author to a peculiar form of dental caries localized in the upper incisors and first described by Dubreuil-Chambardel, in 1919, on the basis of 44 personal observations. In youthful individuals of either sex, between fourteen and nineteen years of age, the upper jaw becomes the seat of caries involving the four incisor teeth together. Whereas, the remaining denture at first remains entirely healthy, other teeth may be secondarily affected, or dental caries may be acquired through ordinary mouth infection. The incisor caries, if of the dry type and fairly rapidly progressive, terminating at the end of not more than four or five years in neurosis and destruction of this incisor group. In a general way, these teeth are not abnormally developed, presenting the regular number, size, and shape, and are properly inserted. Very often, in a proportion of 80 per cent of the cases, the palatine roof is abnormally high, and in three of the forty-four examined cases, an incipient hare-lip is not a simple coincidence, but plays a predominant part in the genesis of the dental caries. The syndrome of this affection accordingly includes: (1) Caries of the upper incisor teeth. (2) Ogival palate. (3) Incomplete hare-lip. The author contributes two additional observations, on youths of 14 and 22 years of age, respectively, and discusses the pathogenesis of the disease, as due to the persistence of the incisor bone as a distinct bone, and the persistence in adults of an infantile arterial type. The pathogenesis of this condition is closely related to the variations of the superior maxilla, which create a morbid predisposition to disease and degenerative processes.

The Etiology and Treatment of Pyorrhea Alveolaris. Rafidin Ahmed. The Indian Medical Gazette, 1920, xv, No. 7, p. 252.

Pyorrhea alveolaris begins with a local irritation at the gum margin, lowering the resistence of the tissues locally and allowing bacteria to implant themselves therein. If it is not checked the disease spreads further down and dissolves the alveolar process, forming pockets. Finally the tooth becomes loose. Oral endamebæ are not the specific cause of pyorrhea, neither is emetin a specific remedy for the disease. The best results are obtained when a case is treated by a combination of the three following methods: (1) Local surgical treatment by the dentist. (2) General systemic treatment by the physician. (3) Vaccine therapy. This combined treatment is in conformity with the associated etiologic factors, which are local and systemic. The local causes are partly mechanical and partly infectious, the former being those responsible for ordinary gingivitis, usually calculi or tartar deposits. The local infectious causes are the pus-producing bacteria, the chief of which are the pneumococcus in chain or diplo-forms, staphylococcus aureus, streptococcus, and micrococcus catarrhalis. The systemic causes are predisposing rather than exciting causes, such as a lowered general resistance, due to acute infectious diseases, especially pneumonia and typhoid fever. Attention to the hygiene of the mouth is the best prophylaxis against pyorrhea alveolaris. In the presence of the disease itself, all tartar deposits and calculi must be removed; malocclusion corrected, illfitting crowns and plates remedied, and with the aid of the x-ray it must be determined which teeth have lost all bony support; these must be extracted. Vaccine therapy has proved so successful that it is constantly gaining in popularity, and the author has obtained very good results with autogenous vaccines, injecting the vaccine deeply into the upper arm. The interval between the injections should be five days at the beginning and lengthened to ten and fourteen days later on.

Pyorrhea Alveolaris. Real. Journal de Médecine de Paris, 1920, No. 16, p. 323.

The author prefers to designate this disease as chronic alveolodental polyarthritis, this name possessing the advantage of emphasizing the character of the affection while at the same time pointing out the multiple alveolodental lesions which are usually present from the start. In the course of pyorrhea alveolaris, small submucous abscesses which are described under the name of parulis, not infrequently develop in the vicinity of the neck of the teeth, and their appearance is accompanied by aggravation of the pain, the pericervical mucosa becoming raised by the collection of pus. Aside from the pyorrheal form of the disease, which is the most common, there also occurs a much rarer dry form, which is practically noninfectious. Only the atrophic lesions of the alveolus are present, and these develop progressively, finally causing the teeth to fall out, without pus having been demonstrable at any time in the pericervical region.

The determining cause of alveolodental pyorrhea consists of the numerous microorganisms of the buccal cavity, suspended in the saliva or accumulated at the neck of the teeth in the form of tartaric concrements. However,

the infection does not give rise to the typical lesions of pyorrhea alveolaris unless it encounters the assistance of a variety of general or local predisposing causes, which play an important part in the development of the disease and should therefore always be carefully looked for. The neuroarthritic diathesis represents a very common predisposition and its customary manifestations should always be investigated, such as a tendency to congestion, migraine, ptosis, the various forms of lithiasis, and so forth. Diabetes has often been held responsible, and the development of pyorrhea alveolaris has occasionally revealed an undiscovered diabetes. Bright's disease and syphilis have likewise been noted. Nervous diseases complicated by trophic disturbances, such as tabes and general paralysis, often favor the outset of pyorrhea alveolaris. In certain cases where the lesions affect the upper teeth, the alveolar absorption may be such as to result in alveolo-sinus perforation, constituting a condition which has been described as mal perforans of the mouth. Senility is another predisposing cause. It must be kept in mind that pyorrhea alveolaris is especially a disease of old age and under these conditions merely represents a local manifestation of bodily deterioration are weakening. Aside from these general predisposing causes, certain local predisposing factors must be taken into consideration, such as spongy gums, misplaced teeth, deposits of tartar at the neck of the teeth, etc.

Regarding the process through which the various affections referred to above favor the onset and development of chronic alveolodental polyarthritis, it is probable that the majority of the general predisposing causes primarily determine atrophic lesions of the alveolodental articulation. A more simple explanation is that they permanently upset the normal biologic equilibrium of the buccal cavity, thereby favoring the development of any disease and fostering its tendency to become chronic.

Treatment is especially efficient in the early stage of the disease, and tartaric gingivitis must be carefully checked, especially in predisposed individuals. The interdental spaces must be thoroughly cleaned, by brushing the teeth in the vertical direction instead of transversely, as is usually done. Astringent topical applications may be employed for their favorable effect on the congested gums. Digital massage of the alveolus, and especially of the pericervical zone, is also recommended, to be carried out by the patient himself in the morning and at night. In the stationary stage, the treatment must be conducted by a specialist, its principle indications being the destruction of the pus-foci and absolute fixation of the affected parts. The loosened teeth are held in place by means of various appliances. The general alveolodental infection may be fought by autovaccine therapy or intravenous injections of arsenobenzol.

Ankylosis of the Jaw. H. P. Ritchie. The Journal-Lancet, 1920, xl, No. 17, p. 479.

The frequency of this condition is not great, but a number of the cases remain unreported, the possibility of operative repair being apparently not well known in the profession. The occurrence is possible at any time of life, but more usually its inception at least is in the early years of life, about

puberty. Fixation of the jaw in occlusion follows involvement of the temporo-maxillary joint or the contracture of the fascia about the joint, particularly of the muscles, masseter, temporal, or pterygoids; therefore this may be readily considered as articular and extra-articular. The primary cause is divided between infection and traumatism. Dental abscesses are sometimes responsible for infection of this joint. Unilateral involvement seems to be most frequent, although bilateral fixation is noted in a fairly large percentage of cases. Ankylosis of the jaw in youthful individuals will result in a tilting of the lower jaw towards the affected side, producing a characteristic deformity. In the adult, this feature is usually absent, rendering the evidence more or less negative. The diagnosis is more difficult in bilateral fixation, or in those cases where the condition has begun in later life, after the ramus has attained its full growth.

From the surgical viewpoint, there is no chance to obtain a movable joint, or normally to reconstruct it, on account of the shallow shape of the joint and the rather delicate structure of the zygoma. Accordingly, the aim and purpose is to create a false joint either by removal of the head or section of the neck of the ramus. The principle of interposition of fascia reflections on joint surfaces was suggested by J. B. Murphy in the treatment of stiff joints, as presenting the best chance of obtaining permanent motility, and this method is of proved efficiency when applied to ankylosis of the jaw. A flap is turned down from the fascia of the temporal muscle with its base on the zygoma, placed and fixed into the hiatus created by the section of the neck of the ramus. Upon the basis of personal experience in two cases, one with the flap and the other without the flap, the author is inclined to believe that the flap can be dispensed with, which distinctly simplifies the steps of the operation. The incision of the skin may follow almost a straight line, along the external temporal artery, and the neck of the bone may be sectioned, or the head removed in any way selected. In order to avoid recurrences of the condition, after-treatment is imperative, which will prevent the surfaces of the sectioned bone from being apposed in occlusion for any length of time. With this object in view, a rubber gag inserted upon the affected side should be worn during the night, to which the patient becomes readily accustomed. This treatment must be carried on for an arbitrary period of six months.

A Contribution to the Pathology and Treatment of Hypersensitive Dentin. H. Prinz. The Australian Journal of Dentistry, 1920, xxiv, No. 2, p. 35.

Hypersensitive dentin may be defined as a state in which the exposed dentin of a vital tooth is painfully responsive to mechanical, chemical, thermal, or electric irritation. The primary cause must be always attributed to its exposure to an irritant. The author accepts the noninnervation theory of dentin and assumes that hypersensitive dentin denotes a state in which the contents of the dentinal tubules are pathologically altered. This change is brought about by external physicochemical influences which interfere with surface tension, absorption, or imbibition, and diffusion. All three processes are closely allied phenomena. Based upon careful study of its pathology, the author concludes that hypersensitive dentin designates a state of irritation

of the odontoblasts of a vital pulp; this irritation being produced only by external agents or physicochemical processes. The rational principle of treatment should be based on the recognition of its pathologic cause, namely hypertension of the contents of the dentinal tubules. Any method or means which favors the readjustment of the altered colloidal equilibrium and prevents further irritation of the exposed dentin surface is useful for the purpose. Hypersensitive dentin offers good chances for conservative treatment. The applied remedies may be divided into (1) physical and chemical procedures (keen edged instruments and caustics); (2) local and general remedies (local anesthetics and sedatives, general anesthetics, and sedatives). Indirectly, hyperesthesia of dentin may be completely eliminated by locally blocking the sensory nerve fibers leading to the pulp of the respective tooth. On an average most satisfactory results in a single tooth are obtained by using the pericemental injection provided the pericementum is sound.

Perfect Dentition in Old Age. J. C. Butcher. The Lancet, London, 1920, i, 1111.

The author contributes two interesting photographs from casts taken of the mouth of a woman aged eighty-four years; with the comment that in his experience this condition is unique. All the teeth with a single exception are not only present, but strong and extremely well formed, more than efficient for the need of a person of such advanced age. The missing molar VII was removed by the author about two years ago, under nitrous-oxide, when the patient was eighty-two years old. Two or three of the superior incisors have been filled on the labial surface, and one or two other fillings can be seen in the photographs. She is very moderate in diet, and both parents are said to have had exceptionally good teeth.

A Tooth in the Maxillary Antrum. Hahn. Zahntechnische Reform. 1920, No. 34, p. 337.

The following case of antral disease presented several features of unusual medico-legal interest. A large left-sided upper molar tooth broke into two parts during an attempt at extraction, one part with two roots, which was removed, the other with one root which was left behind. The patient, a young woman, failed to return for further treatment, and later on consulted another dentist who injected novocain and tried to remove the remaining fragment. But the root was pushed through the thin wall of the maxillary antrum and slipped into the cavity. According to the patient's statement, the fragment disappeared from the alveolus after the attempted extraction, and two days later, pus exuded from an opening in the maxilla, through which the tooth had vanished into the antrum. Subsequent examination by the author showed the existence of a fistula leading from the alveolus to the maxillary antrum, as well as the presence of the fragment within the cavity. Through the entrance avenue created at the time of the unsuccessful attempt at extraction, pus-producing germs (staphylococci and streptococci) had penetrated into the mucosa of the maxillary antrum and suppuration had become established on the left side. For the removal of this suppuration, the performance of the radical operation according to Caldwell-Luc was recommended, in order to

extract at the same time the dental fragment from the maxillary antrum, and the operation was performed under local anesthesia. After the cavity had been widely opened, the fragment was removed by way of the canine fossa from where it lay loose in the antrum, surrounded by masses of polyps and thickened mucous membranes. The cavity was scraped, the bony wound-margins were trimmed, drainage was applied through the inferior nasal meatus, and finally the antrum was loosely packed. Uninterrupted wound-repair followed and the patient made a good recovery. The case was one of maxillary sinus suppuration due to luxation of a diseased dental root into a previously healthy maxillary antrum.

The Temporary Teeth: Disorders Due to Their Neglect. J. Ross Snyder. Paper read at Seventy-first Annual Session of American Medical Association, New Orleans, April, 1920.

The care of the child's teeth is a subject that until recently was ignored by the pediatrist and neglected by the dentist. The majority of dentists have neither the time nor the inclination to treat temporary teeth. The early care of the child's teeth is a matter in which the pediatrist should assume greater responsibility. It has been estimated in New York that 98 per cent of all teeth are perfect when they emerge from the gums and that by the time the children reach the first grade in school 98 per cent of them have bad teeth, and one-third have abscess conditions. Equally bad conditions have been revealed by the inspection of the mouth of school children elsewhere. Clean and properly prepared food, when it passes through a neglected mouth may become infected and give rise to gastrointestinal disturbances. In the presence of an unclean mouth, infection occurs more easily. The premature loss of the deciduous teeth is the most frequent cause of malocclusion and deformities of the face and jaws. There is great need in every community of education as to the need of early dental hygiene and prophylaxis. The education of the parents in this matter cannot be left to the dentist, but is a responsibility which the physician, and more particularly the pediatrician, should assume. Pediodontia is still in its infancy but merits culture and development.

Focal Infections and Tissue Specificities. G. McConnell. The Journal of the National Dental Association, 1920, vii, No. 9, p. 806.

The occurrence of focal infections depends on an invasion by bacteria, with subsequent inflammatory reactions. To all intents and purposes, the presence of a focal infection means the formation of a small abscess that has been encapsulated to a varying degree. Such lesions may be found in various parts of the body, but it would seem that the most common site is around the apices of the teeth. As long as it remains isolated, the danger from such an area is comparatively slight. In regard to the causation of focal infections about the roots of teeth, it is highly probable that the infection originates in the tissues in or about the teeth. In those cases in which extensive cavity formation has taken place, so that the pulp has been exposed, it is very easy to realize how readily the inflammation can extend. It is not necessary that the canal be

completely exposed, as after about one-half of the dentin has been destroyed, the larger part of the dentinal tubules are open and there is little to interfere with the passage of the bacteria. There are, however, many instances where apparently there is no lesion in the tooth to account for the infection. The anatomic arrangement of the tooth and its surrounding structures is suggestive. From the apical vein are given off branches which extend along the peridental membrane close to the gum margin. The pathogenic organisms, which are constantly present in the mouth, may accordingly penetrate the veins and give rise to partial thrombosis, the coagulation continuing to extend along the vessel, with a tendency to cause inflammation in the surrounding tissue. In many teeth there are multiple foramina to be found at different levels. In cases of pyorrhea where a large part of the tooth is exposed as a result of absorption of the interdental portions of the alveolar process, the bacteria can readily gain entrance and propagate the infection. The inflammation of the peridental membrane, which is the vascular structure involved primarily, promptly affects the neighboring bone-tissue. This tissue appears to have very little resistance, it breaks down and becomes absorbed, leaving a definite cavity containing purulent material. This process may continue and finally make an exit in any one of many directions, or it may remain distinctly localized. In order that it may be rendered harmless, the cells of the peridental membrane are seen to undergo multiplication with the formation of connective tissue, culminating in the formation of a distinct capsule. Examination of the alveolar process around such areas at times shows a distinct condensation of the bone that is in immediate contact with the inflammatory portion; giving in its turn an extra barrier to the extenson of the process. A break somewhere of the protective formations may permit the bacteria to enter the lymphatics and eventually make their way into the circulation. In this way, pathogenic microorganisms may be carried to distant parts of the body, where they become lodged and set up inflammations of varying severity. Not all parts of the body seem to be equally susceptible to injury, however, the greatest number of secondary lesions, probably being found in connection with the joints. Endocarditis, or rather a restricted inflammation of the valvular portion, is not uncommonly referable to a focal infection of dental origin. Iritis in numerous instances is due to localized abscesses about the teeth and is relieved by the removal of the diseased tooth. Focal inflammations commonly are caused by the streptococcus viridans, and this same organism can give rise to systemic infections. The author emphasizes in conclusion that every practitioner who makes the diagnosis of an apical abscess must remember that this condition has the potential power of causing very serious trouble, although this may not necessarily result in all of the cases. Dental films require a skilled and experienced roentgenologist for their correct interpretation.

The International Journal of Orthodontia and Oral Surgery

PUBLISHED THE FIFTEENTH OF EVERY MONTH BY

THE C. V. MOSBY CO., 801-809 Metropolitan Bldg., St. Louis, Mo.

Foreign Depots—*Great Britain*—Henry Kimpton, 263 High Holborn, London, W. C.; *Australasia*—Stirling & Co., 317 Collins Street, Modern Chambers, Melbourne; *India*—"Practical Medicine," Egerton Street, Delhi; *Porto Rico*—Pedro C. Timothee, Rafael Cordero 68, San Juan, P. R.

Subscription Rates—Single copies, 50 cents. To anywhere in United States, Cuba, Porto Rico, Canal Zone, Mexico, Hawaii and Philippine Islands, $5.00 per year in advance. Under foreign postage, $5.40. Volume begins with January and ends with December of each year.

Remittances—Remittances for subscriptions should be made by check, draft, postoffice or express money order, or registered letter payable to the publishers, The C. V. Mosby Company.

Contributions—The editor will be pleased to consider the publication of original communications of merit on orthodontic and allied subjects, which must be contributed solely to this journal.

Opinions—Neither the editor nor the publisher hold themselves responsible for the opinions of contributors, nor are they responsible for other than editorial statements.

Reprints—Since it is not desirable to hold type standing longer than absolutely necessary, all requests for reprints should be made at time of submitting manuscript for publication. Rate card will be sent with galley proof.

Communications—Contributed articles, illustrations, letters, books for review, and all other matter pertaining to the editorial department should be addressed to the Editor, Doctor Martin Dewey, 501 Fifth Ave., New York City. All communications in regard to advertising, subscriptions, change of address, etc., should be addressed to the publishers, The C. V. Mosby Company, 801-809 Metropolitan Building, St. Louis, Mo.

Illustrations—Such halftones and zinc etchings as in the judgment of the editor are necessary to illustrate articles will be furnished when photographs or drawings are supplied by the authors of said articles.

Advertisements—Objectionable advertisements will not be accepted for publication in this journal. Forms close first of month preceding date of issue. Advertising rates and sizes on application.

Change of Address—The publishers should be advised of change of subscriber's address about fifteen days before date of issue with both new and old addresses given.

Nonreceipt of Copies—Complaints for nonreceipt of copies or requests for extra numbers must be received on or before the fifteenth of the month of publication; otherwise the supply is apt to be exhausted.

Entered at the Post Office at St. Louis, Mo., as Second-Class Matter.

EDITORIALS

Defective Teeth Among School Children

THE condition of the teeth of school children has received considerable attention during the last few years and various attempts have been made to obtain statistics on unhealthy teeth. A report published by Dr. Royal S. Copland, Health Commissioner of New York City, contains some facts relative to school children that can hardly be passed without comment. Dr. Copland has made a comparison of the physical defects of school children based on conditions as found in 1909 and 1919. The report as published in the *New York Times* does not state the number of children examined or in what part of the city the examinations were made, but we presume it was a composite report covering examinations made over the entire city of New York. Not only were the teeth examined, but other physical defects were noted. A comparison of these defects as found in 1909 and 1919 is quite interesting.

The report covers ten physical defects, seven of which show a decrease over the ten years between 1909 and 1919. The only three that show an increase are malnutrition, cardiac defects, and defective teeth. Beginning with defective vision, we notice a 6 per cent reduction in the two tabulations. Defective hearing in 1909 was 1.0 per cent; in 1919, 0.5 per cent, which would be half as many with defective hearing in 1919 as were found in 1909. Defective nasal breathing also fell from 18.1 per cent to 11.6 per cent; hypertrophied tonsils, from 22.0 per cent to 15.3 per cent. When we come to malnutrition we notice in 1909, 3.1 per cent in 1919, 19.9 per cent. This means that where one child was found suffering from malnutrition in 1909, six were found in 1919, or an increase of 600 per cent in ten years. This ratio is entirely too great, and we can find no reason for it. We wonder whether some of the difference is not the result of a more careful examination made at the present time than was made in 1909. It has only been comparatively few years that the medical profession has made the careful examination for malnutrition that it now made, and it is very probable that an increase in number is the result of improved examination methods. Cardiac disease also shows an increase from 0.65 per cent in 1909 to 1.5 per cent in 1919. This increase should be more if malnutrition actually increased as much as the report shows. Pulmonary diseases show a slight decrease over the ten-year period, which also is strange if malnutrition has increased, for it is a well-known fact that pulmonary diseases always increase as malnutrition becomes greater.

When we come to defective teeth, we find 57.0 per cent in 1909 and 62.3 per cent in 1919. This increase in ten years we think is also the result of a more careful examination than was made in 1909. If there has been an actual increase in malnutrition, we would expect to note an increase in defective teeth. However, in the face of other conditions as tabulated, we are inclined to doubt an actual increase as extending over a period of ten years. Until there are other reports turned in, we are inclined to believe the increase of dental defects from 1909 to 1919 has been the result of more careful examinations and not an increase in pathologic conditions.

St. Louis University Centennial Endowment Fund

FOR the first time in more than a century of endeavor, St. Louis University, which established the first school of dentistry west of the Mississippi River and which operates the only school of Class "A" rating in Missouri, has made a public appeal for funds, to be used largely for the expansion and support of its dental and medical departments. The university has asked its alumni and friends to raise the sum of $3,000,000, the income from one half of which is to be used to pay the teaching staff of the Dental and Medical Colleges. New buildings and clinics for the dental and medical branches will cost $550,000 and the remainder will be used for extension work of the Institute of Law, School of Commerce and Finance, and College of Arts and Sciences.

The money asked for will be known as the Centennial Endowment Fund, although the 100th anniversary of the institution occurred during the war,

when more than 3000 of the faculty, alumni and undergraduates were under arms, the College of Dentistry, in the three classifications, being represented by 374 men.

As an outgrowth of this activity and because of a recent ruling of the War Department that in future all vacancies in the Dental Corps of the United States Army will be filled by graduates of Dental Colleges having a Reserve Officers Training Corps, such a unit now has been organized at the St. Louis University Dental School, with Major Robert W. Kerr, Medical Corps, U. S. Army, detailed by the Government as the Professor of Military Science and Tactics. Under the law there will be but ten such dental college units of the R. O. T. C. in the entire United States.

As the purpose of the Endowment Fund is largely to keep the Dental School up to the high standard which caused it to be selected by the Government as one of these ten honor schools, the university asks the graduates of the College of Dentistry, now scattered all over the earth, to constitute themselves committees of one to assist in the realization of the fund.

ORTHODONTIC NEWS AND NOTES

The editors desire to make this department a permanent feature of the Journal, but in order to do so must have the full support of the orthodontic profession throughout the country. We would deem it a great favor if our subscribers and readers would send in such announcements as might be of interest to the profession.

Meeting of the American Society of Orthodontists

The next meeting of the American Society of Orthodontists will be held at the Ambassador Hotel in Atlantic City, N. J., on April 27, 28, 29, and 30, 1921. An invitation is extended to all who are interested in orthodontia.—J. Lowe Young, D.D.S., President. Ralph Waldron, D.D.S., Sec.-Treas.

Alumni Society of the Dewey School of Orthodontia

The next Annual Meeting of the Alumni Society of the Dewey School of Orthodontia will be held on April 25 and 26 at the Hotel Ambassador in Atlantic City, N. J. Clinics and evening sessions will be included in the program. All interested in orthodontia are cordially invited to attend these meetings.—George F. Burke, Sec., 741-43 David Whitney Bldg., Detroit, Mich.

Kentucky State Dental Association

The next Annual Meeting of the Kentucky State Dental Association will be held in Louisville, Ky., April 13-16, 1921, Seelbach Hotel as Headquarters. A clinical program of unusual interest is being arranged. Address all correspondence to W. M. Randall, Sec., Louisville, Ky.

Odontological Society of Western Pennsylvania

On April 12 and 13 the Odontological Society of Western Pennsylvania will hold its Fortieth Annual Spring Meeting at the William Penn Hotel, Pittsburgh, Pa.

Tennessee State Dental Association

The Fifty-fourth Annual Meeting of the Tennessee State Dental Association will be held at Nashville, Tenn., May 17, 18, 19, 20, 1921.—J. J. Vaughn, D.D.S., Chairman Publicity Committee.

The Pacific Coast Society of Orthodontists

The Annual Meeting of the Pacific Coast Society of Orthodontists will be held at the Hotel Portland, Portland, Oregon, February 16, 17, and 18, 1921—Dr. H. L. Morehouse, President. Dr. Carl O. Engstrom, Sec.-Treas.

First Class in Military Dentistry

The first class in Military Dentistry ever held in the United States was conducted in the Dental College of St. Louis University yesterday by Major Robert W. Kerr, U. S. Medical Corps. Major Kerr explained to the 171 sophomores and freshmen who constitute the R. O. T. C. of St. Louis "U" that while similar classes would be established in nine other class "A" dental schools of the United States, the St. Louis University unit is the only one now fully organized.

According to Major Kerr, the course will take four years, including plastic surgery and the treatment of gunshot wounds of the jaw and face. At the conclusion of the course each graduate of the St. Louis University College of Dentistry will receive a commission as a 1st Lieutenant in the Dental Reserve Corps of the United States Army, and all regular officers of the Dental Corps will in future be drawn from this reserve.

The St. Louis Study Club

The St. Louis Study Club announces its third annual midwinter clinic, to be held in St. Louis at the American Hotel Annex on January 15, 1921, from 2 to 5 P. M. At this clinic will be shown the results of the work accomplished during the session just closing. Following the clinic and at 6:30 a dinner will be given in honor of the instructors. All ethical dentists are invited to attend.

Notes of Interest

Dr. Walter G. Hutchison announces the opening of his dental offices, 1521 Main Street, Columbia, South Carolina. Practice limited to x-ray, pyorrhea, exodontia and surgery.

Dr. J. Lowe Young announces the removal of his office to 18 West 74th Street, New York. Orthodontia exclusively.

Monsieur Ernest Bonifas, Conseiller á la Cour di Appel, and Madame Ernest Bonifas announce the marriage of their daughter, Mademoiselle Elisabeth Bonifas to Docteur James Quintero, Lyon, France, December 28, 1920.

Mrs. Loretta Pilkington Walters announces the marriage of her daughter Mary Virginia to Dr. Edmond Beauregard Arnold on Wednesday, December 29th, 1920, St. Louis, Mo.